FCC PART 15.247

TEST REPORT

For

SingularXYZ Intelligent Technology Ltd.

Floor 2, Building A, No. 599 Gaojing Road, Shanghai, China

FCC ID: 2A4O3-X1

Report Type:	**Product Name:**
Original Report	GNSS Receiver

Report Number:	RKSA240425001-00C
Report Date:	2024-11-01
Reviewed By:	Bard Liu
Approved By:	Kyle Xu
Prepared By:	Bay Area Compliance Laboratories Corp. (Kunshan) No.248 Chenghu Road, Kunshan, Jiangsu Province, China Tel: +86-512-86175000 Fax: +86-512-88934268 www.baclcorp.com.cn

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REPORT REVISION HISTORY

Number of Revisions	Report No.	Version	Issue Date	Description
0	RKSA240425001-00C	R1V1	2024-11-01	Initial Release

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Applicant	SingularXYZ Intelligent Technology Ltd.
Product Name:	GNSS Receiver
Tested Model	X1
Series Model:	X1 Lite, X1 Pro, E1, E1 Plus, E1 Pro
Model Difference:	SIM card slot, top cover, model name, see the declaration letter for details
Power Supply	DC 5~12V from type C port or DC 9V~28V from external power supply or DC 7.2V from battery
RF Function:	2.4G Wi-Fi
Operating Band/Frequency:	2.4G Wi-Fi: 2412~2462 MHz(802.11b/g/n20), 2422~2452 MHz(802.11n40)
Maximum Peak Output Power:	802.11b: 9.22 dBm 802.11g: 9.72 dBm 802.11n20: 10.06 dBm 802.11n40: 9.75 dBm
Channel Number:	11(802.11b/g/n20), 7(802.11n40)
Channel Separation:	5 MHz
Modulation Type:	DSSS, OFDM
Antenna Type:	Patch antenna
★Maximum Antenna Gain:	1.34 dBi

Note: 1.The maximum antenna gain was declared by the manufacturer.
2. Pre-scan powered by type c port and RS232 port, only the worst case powered by type C port was record.

All measurement and test data in this report was gathered from production sample serial number: RKSA240425001-1（X1 for full test）, RKSA240425001-1 (X1 Lite for Spot check the output power and Radiated Emissions below 1GHz) (Assigned by the BACL (Kunshan). The EUT supplied by the applicant was received on 2024-04-25.)

Objective

This report is prepared for *SingularXYZ Intelligent Technology Ltd.* in accordance with Part 2-Subpart J, Part 15-Subparts A and C of the Federal Communication Commissions' rules.

The tests were performed in order to determine Compliant with FCC Part 15, Subpart C, and section 15.203, 15.205, 15.207, 15.209 and 15.247 rules.

Test Methodology

All measurements contained in this report were conducted with ANSI C63.10-2013, American National Standard of Procedures for Compliant Testing of Unlicensed Wireless Devices and FCC 558074 D01 15.247 Meas Guidance v05r02.

Measurement Uncertainty

Item		Uncertainty
AC Power Lines Conducted Emissions		3.19dB
RF conducted test with spectrum		0.9dB
RF Output Power with Power meter		0.5dB
Radiated emission	9 kHz~150 kHz	3.8dB
	150 kHz~30 MHz	3.4dB
	30MHz~1GHz	6.11dB
	1GHz~6GHz	4.45dB
	6GHz~18GHz	5.23dB
	18GHz~40GHz	5.65dB
Occupied Bandwidth		0.5kHz
Temperature		1.0℃
Humidity		6%

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Kunshan) to collect test data is located on the No.248 Chenghu Road, Kunshan, Jiangsu Province, China.

Bay Area Compliance Laboratories Corp. (Kunshan) is accredited in accordance with ISO/IEC 17025:2017 by NVLAP (Lab code: 600338-0), and the lab has been recognized as the FCC accredited lab under the KDB 974614 D01, the FCC Designation No. : CN5055.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

Channel List for Wi-Fi Mode:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2412	7	2442
2	2417	8	2447
3	2422	9	2452
4	2427	10	2457
5	2432	11	2462
6	2437	/	/

For 802.11b, 802.11g and 802.11n-HT20 mode, EUT was tested with Channel 1, 6 and 11.
For 802.11n-HT40 mode, EUT was tested with Channel 3, 6 and 9.

Equipment Modifications

No modification was made to the EUT tested.

EUT Exercise Software

RF test software: ESP32

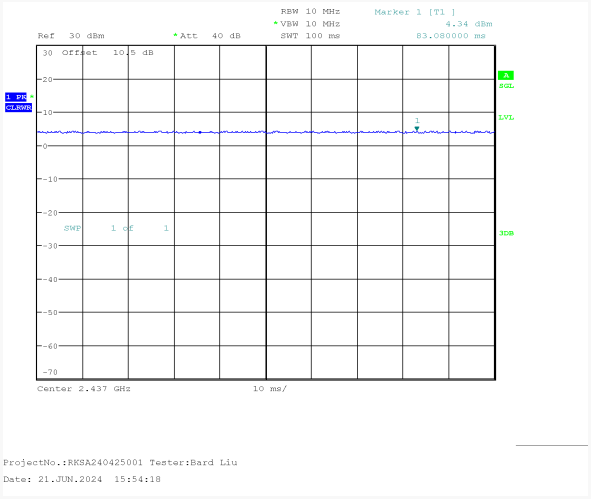
Pre-scan with all the data rates, and the worst case was performed as below:

Mode	Data Rate	★Power Level
802.11b	1 Mbps	Default
802.11g	6 Mbps	Default
802.11n-HT20	MCS0	Default
802.11n-HT40	MCS0	Default

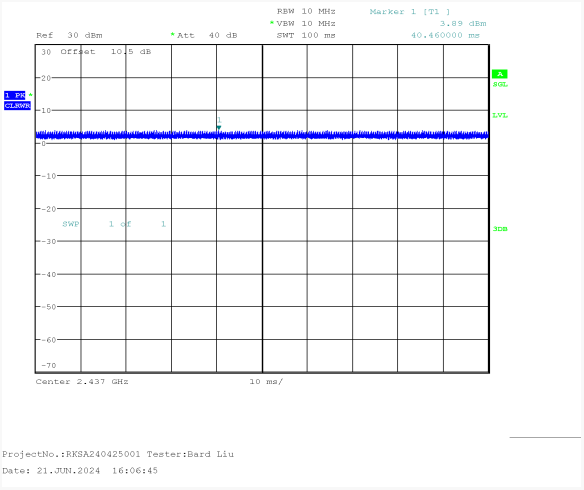
Note: The power level was declared by the applicant.

Duty Cycle:

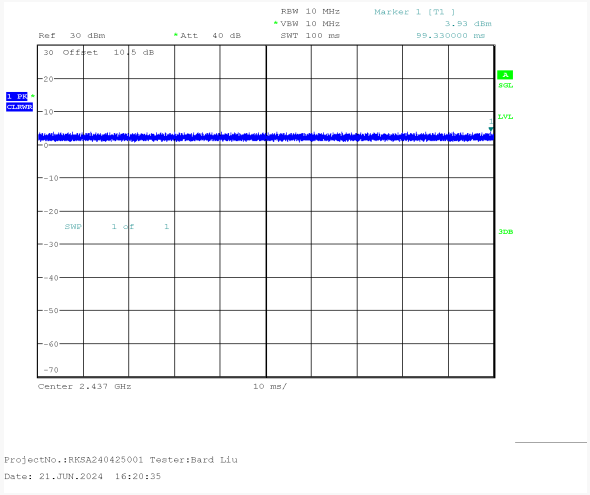
802.11b Mode Middle Channel



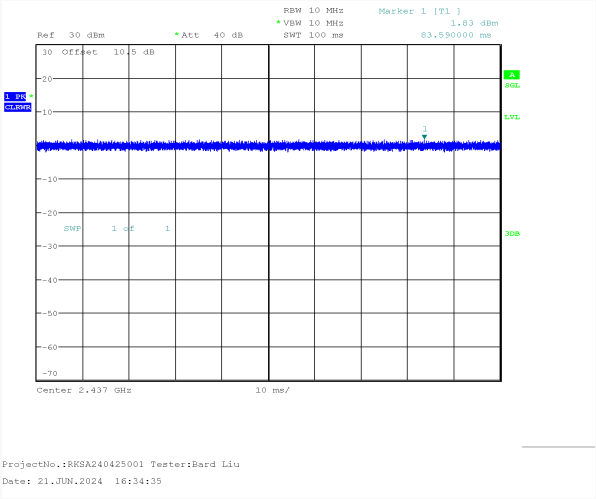
802.11g Mode Middle Channel



802.11n-HT20 Mode Middle Channel



802.11n-HT40 Mode Middle Channel



Mode	Duty Cycle (%)	Ton(ms)	Ton+off(ms)	10log(1/x)
802.11b	100	100	100	0
802.11g	100	100	100	0
802.11n-HT20	100	100	100	0
802.11n-HT40	100	100	100	0

Note: “x” means the Duty Cycle.

Support Equipment List and Details

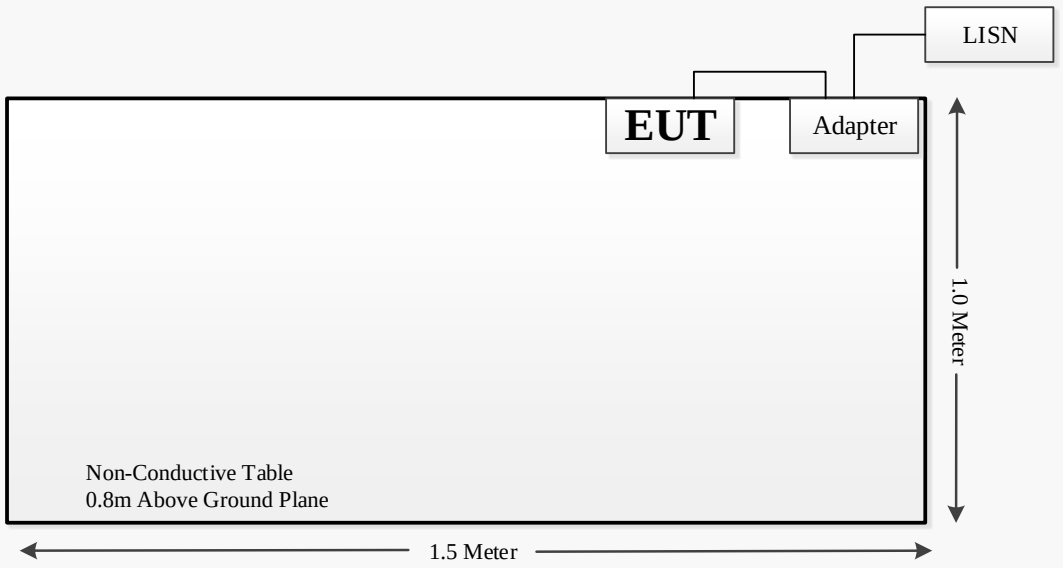
Manufacturer	Description	Model	Serial Number
Power on Tools Co.,Ltd.	Adapter	DA-00052000UL001	Unknown

External I/O Cable

Cable Description	Length (m)	From Port	To
Power Cable 1	1.0	AC Source/LISN	Adapter
Power Cable 2	1.5	Adapter	EUT

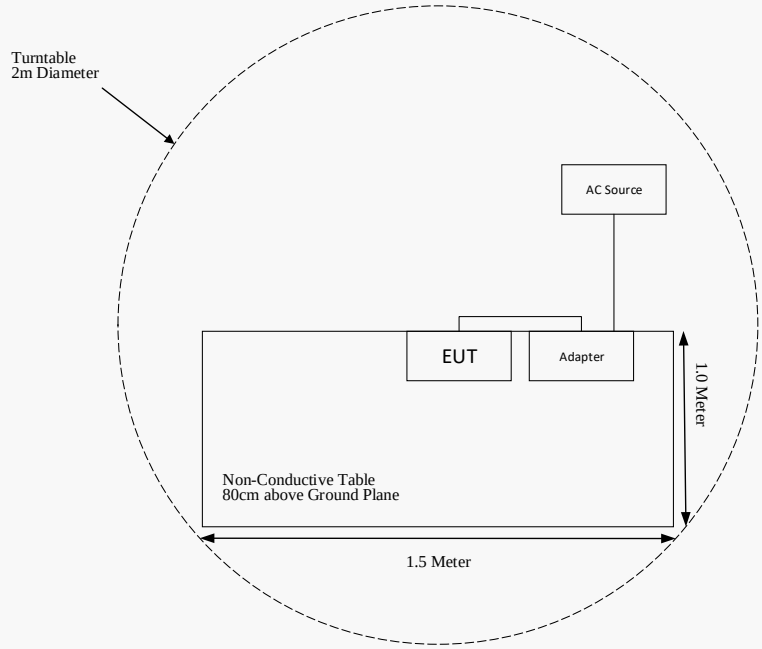
Block Diagram of Test Setup

For Conducted Emissions:

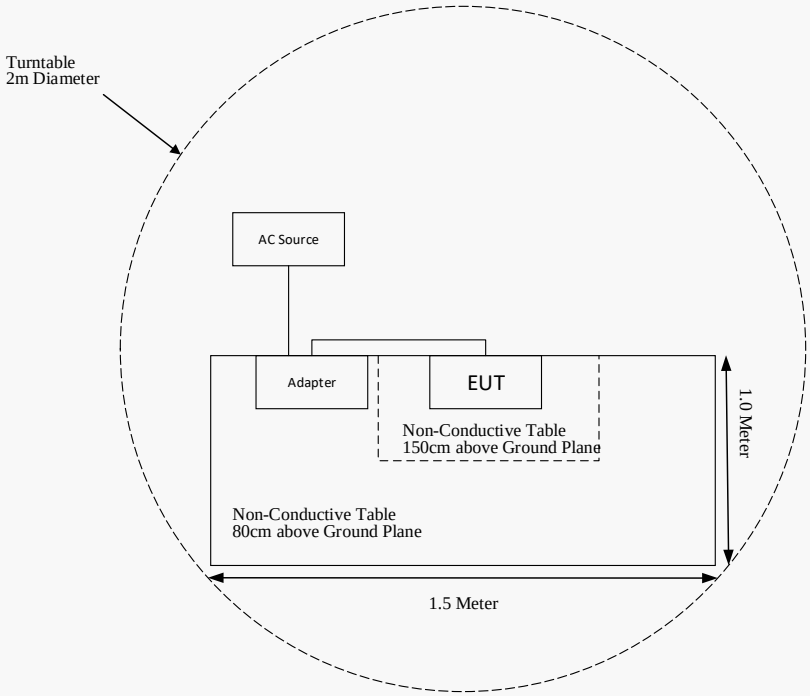


Block Diagram of Test Setup

For Radiated Emissions(Below 1GHz):



For Radiated Emissions(Above 1GHz):



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§1.1310 & §2.1091	MAXIMUM PERMISSIBLE EXPOSURE (MPE)	Compliant
§15.203	Antenna Requirement	Compliant
§15.207 (a)	AC Line Conducted Emissions	Compliant
§15.205, §15.209, §15.247(d)	Spurious Emissions	Compliant
§15.247 (a)(2)	6 dB Emission Bandwidth	Compliant
§15.247(b)(3)	Maximum Conducted Output Power	Compliant
§15.247(d)	100 kHz Bandwidth of Frequency Band Edge	Compliant
§15.247(e)	Power Spectral Density	Compliant

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Radiated Emission Test (Chamber #1)					
Rohde & Schwarz	EMI Test Receiver	ESCI	100195	2024-04-23	2025-04-22
Sunol Sciences	Hybrid Antenna	JB3	A090314-1	2023-11-11	2024-11-10
ETS-LINDGREN	Loop Antenna	6512	108100	2023-11-09	2024-11-08
Narda	6dB Attenuator	773-6	10690812-2-1	2023-11-11	2024-11-10
Sonoma Instrument	Amplifier	310N	171205	2024-04-23	2025-04-22
MICRO-COAX	Coaxial Cable	Cable-8	008	2024-04-23	2025-04-22
MICRO-COAX	Coaxial Cable	Cable-9	009	2024-04-23	2025-04-22
MICRO-COAX	Coaxial Cable	Cable-10	010	2024-04-23	2025-04-22
Radiated Emission Test (Chamber #2)					
Rohde & Schwarz	EMI Test Receiver	ESU40	100207	2024-04-25	2025-04-24
ETS-LINDGREN	Horn Antenna	3115	9207-3900	2024-06-27	2025-06-26
ETS-LINDGREN	Horn Antenna	3116	2516	2023-12-08	2024-12-07
A.H.Systems, inc	Amplifier	PAM-0118P	512	2024-04-25	2025-04-24
EM Electronics Corporation	Amplifier	EM18G40G	060726	2024-04-25	2025-04-24
MICRO-TRONICS	Band Reject Filter	BRM50702	G024	2024-04-25	2025-04-24
Narda	Attenuator	20dB	020	2024-04-25	2025-04-24
Rohde & Schwarz	Auto Test Software	EMC32	100361	N/A	N/A
MICRO-COAX	Coaxial Cable	Cable-6	006	2024-04-23	2025-04-22
MICRO-COAX	Coaxial Cable	Cable-11	011	2024-04-25	2025-04-24
MICRO-COAX	Coaxial Cable	Cable-12	012	2024-04-25	2025-04-24
MICRO-COAX	Coaxial Cable	Cable-13	013	2024-04-25	2025-04-24
RF Conducted Test					
Rohde & Schwarz	Spectrum Analyzer	FSU26	200103	2024-04-24	2025-04-23
Anritsu	Power Sensor	MA24418A	12621	2024-04-23	2025-04-22
Narda	Attenuator	10dB	N/A	2024-04-23	2025-04-22
Conducted Emission Test					
Rohde & Schwarz	EMI Test Receiver	ESR	101746	2024-04-23	2025-04-22
Rohde & Schwarz	LISN	ENV216	101115	2024-04-23	2025-04-22
Audix	Test Software	e3	V9	N/A	N/A
Rohde & Schwarz	Pulse Limiter	ESH3-Z2	0357.8810.54	2024-04-23	2025-04-22
MICRO-COAX	Coaxial Cable	Cable-15	015	2024-04-23	2025-04-22

Statement of Traceability: Bay Area Compliance Laboratories Corp. (Kunshan) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

FCC §1.1310 & §2.1091 - MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Applicable Standard

According to subpart §2.1091 and subpart §1.1310, systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

Limits for Maximum Permissible Exposure (MPE) (§1.1310, §2.1091)

Limits for Occupational/Controlled Exposure				
Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm^2)	Averaging Time |E|, |H| or S (minutes)
0.3- 3.0	614	1.63	(100)*	6
3.0 - 30	1842/f	4.89/f	($900/f^2$)*	6
30-300	61.4	0.163	1.0	6
300-1500	/	/	f/300	6
1500-100,000	/	/	5	6

Limits for General Population/Uncontrolled Exposure				
Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm^2)	Averaging Time (minutes)
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*($180/f^2$)	30
30-300	27.5	0.073	0.2	30
300-1500	/	/	f/1500	30
1500-100,000	/	/	1.0	30

f = frequency in MHz; * = Plane-wave equivalent power density;

According to §1.1310 and §2.1091 RF exposure is calculated.

Calculated Formulary

Predication of MPE limit at a given distance
$S = PG/4\pi R^2$ = power density (in appropriate units, e.g. mW/cm^2);
P = power input to the antenna (in appropriate units, e.g., mW);
G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain;
R = distance to the center of radiation of the antenna (appropriate units, e.g., cm);

$$\sum_i \frac{S_i}{S_{Limit,i}} \leq 1$$

Calculated Data:

General Population/Uncontrolled

Mode	Frequency Range (MHz)	Antenna Gain		★Tune-up Output Power		Evaluation Distance (cm)	Power Density (mW/cm^2)	MPE Limit (mW/cm^2)	MPE ratio
		(dBi)	(numeric)	(dBm)	(mW)				
Classic BT	2402-2480	0.1	1.02	-1.5	0.71	20	0.0001	1.0	0.0001
2.4G Wi-Fi	2412-2462	1.34	1.36	10.5	11.22	20	0.0030	1.0	0.0030
GSM 850	824-849	-6.24	0.24	25.81	381.07	20	0.0182	0.55	0.0331
PCS 900	1850-1910	-2.95	0.51	22.81	190.99	20	0.0194	1.0	0.0194
WCDMA band 2	1850-1910	-2.95	0.51	25.00	316.23	20	0.0321	1.0	0.0321
WCDMA band 4	1710-1755	-5.48	0.28	25.00	316.23	20	0.0176	1.0	0.0176
WCDMA band 5	824-849	-6.24	0.24	25.00	316.23	20	0.0150	0.55	0.0273
LTE Band 2	1850-1910	-2.95	0.51	25.00	316.23	20	0.0321	1.0	0.0321
LTE Band 4	1710-1755	-5.48	0.28	25.00	316.23	20	0.0176	1.0	0.0176
LTE Band 5	824-849	-6.24	0.24	25.00	316.23	20	0.0150	0.55	0.0273
LTE Band 7	2500-2570	-4.89	0.32	25.00	316.23	20	0.0201	1.0	0.0201
LTE Band 12	699-716	-15.37	0.03	25.00	316.23	20	0.0018	0.47	0.0038
LTE Band 13	777-787	-10.27	0.09	25.00	316.23	20	0.0059	0.52	0.0113
LTE Band 25	1850-1915	-2.95	0.51	25.00	316.23	20	0.0321	1.0	0.0321
LTE Band 26	814-849	-6.24	0.24	25.00	316.23	20	0.0150	0.54	0.028
LTE Band 38	2570-2620	-6.40	0.23	25.00	316.23	20	0.0145	1.0	0.0145
LTE Band 41	2496-2690	-2.62	0.55	25.00	316.23	20	0.0346	1.0	0.0346

Occupational/Controlled

Mode	Frequency Range (MHz)	Antenna Gain		★Tune-up Output Power		Evaluation Distance (cm)	Power Density (mW/cm^2)	MPE Limit (mW/cm^2)	MPE ratio
		(dBi)	(numeric)	(dBm)	(mW)				
UHF	410-470	-3.33	0.46	30.5	1122.02	20	0.1027	1.3667	0.0751

Note:
1. For the above tune up power were declared by the manufacturer.
2. The WWAN module FCC ID: XMR201903EG25G (Grant on: 03/29/2019).
3. 2.4G Wi-Fi/BT, WWAN and UHF can transmit simultaneously; the worst condition as below:

$$\sum_i \frac{S_i}{S_{Limit,i}}$$ =0.0030+0.0346+0.0751=0.1127< 1.0

Result: The device meet FCC MPE at 20 cm distance.

FCC §15.203 - ANTENNA REQUIREMENT

Applicable Standard

According to § 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the user of a standard antenna jack or electrical connector is prohibited. The structure and application of the EUT were analyzed to determine Compliant with section §15.203 of the rules. §15.203 state that the subject device must meet the following criteria:

a. Antenna must be permanently attached to the unit.
b. Antenna must use a unique type of connector to attach to the EUT.
c. Unit must be professionally installed, and installer shall be responsible for verifying that the correct antenna is employed with the unit.

And according to FCC 47 CFR section 15.247 (b), if the transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Antenna Connector Construction

The EUT has a patch antenna for 2.4G Wi-Fi, and the antenna gain is 1.34 dBi, which is permanently attached to the unit, fulfill the requirement of this section. Please refer to the EUT photos.

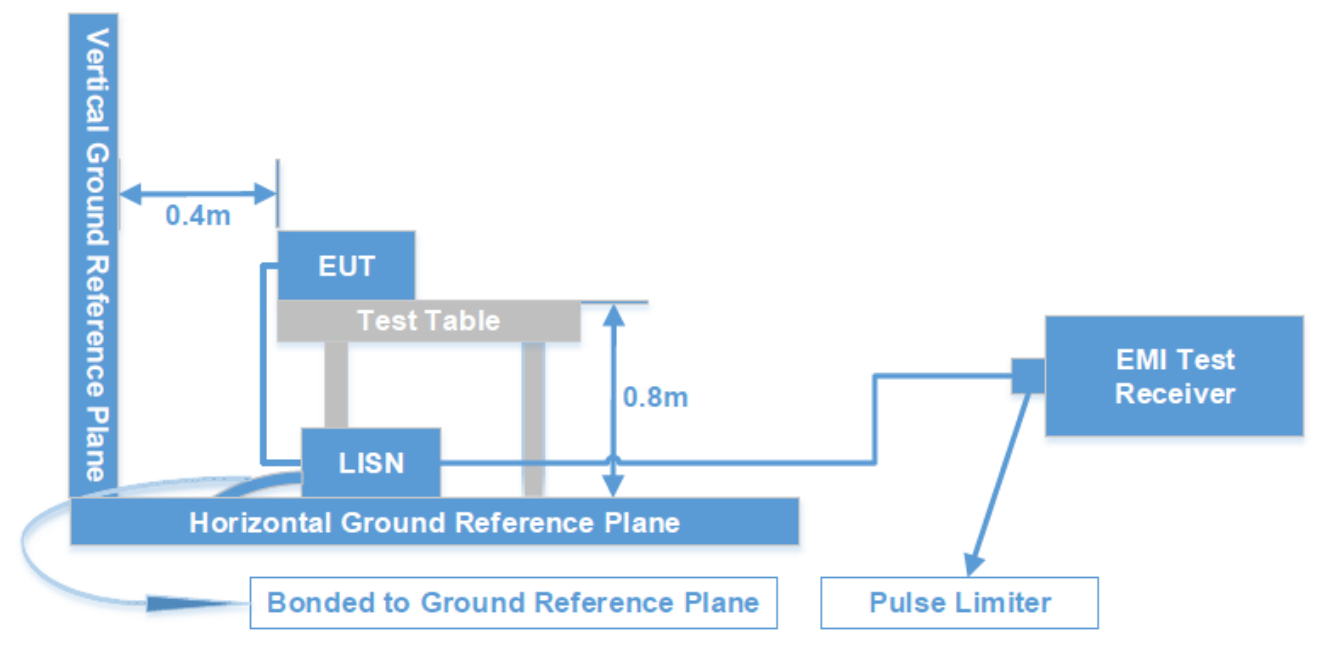
Result: Compliant.

FCC §15.207 (a) - AC LINE CONDUCTED EMISSIONS

Applicable Standard

FCC §15.207(a)

Test System Setup



The measurement procedure of EUT setup is according with ANSI C63.10-2013. The related limit was specified in FCC Part 15.207.

The spacing between the peripherals was 10 cm.

EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz.

During the conducted emission test, the EMI test receiver was set with the following configurations:

Frequency Range	RBW	VBW
150 kHz - 30 MHz	9 kHz	30 kHz

Test Procedure

ANSI C63.10-2013 clause 6.2

During the conducted emission test, the EUT or adapter was connected to the outlet of the LISN.

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

If the maximum peak value of the emissions is below the average limit, the QP value and average value measurement will not need to be performed and only record the maximum peak measured value to meet the requirements.

Level & Over Limit Calculation

The Level is calculated by adding LISN VDF (Voltage Division Factor), Cable Loss and Transient Limiter Attenuation from the Meter Reading. The basic equation is as follows:

Factor (dB) = LISN VDF (dB) + Cable Loss (dB) + Transient Limiter Attenuation (dB)
Level (dBμV) = Read level (dBμV) + Factor (dB)

The "**Over Limit**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, an Over Limit of 7 dB means the emission is 7 dB above the limit. The equation for Over Limit calculation is as follows:

Over Limit (dB) = Level (dBμV) - Limit (dBμV)

Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Part 15.207.

Test Data: See Appendix

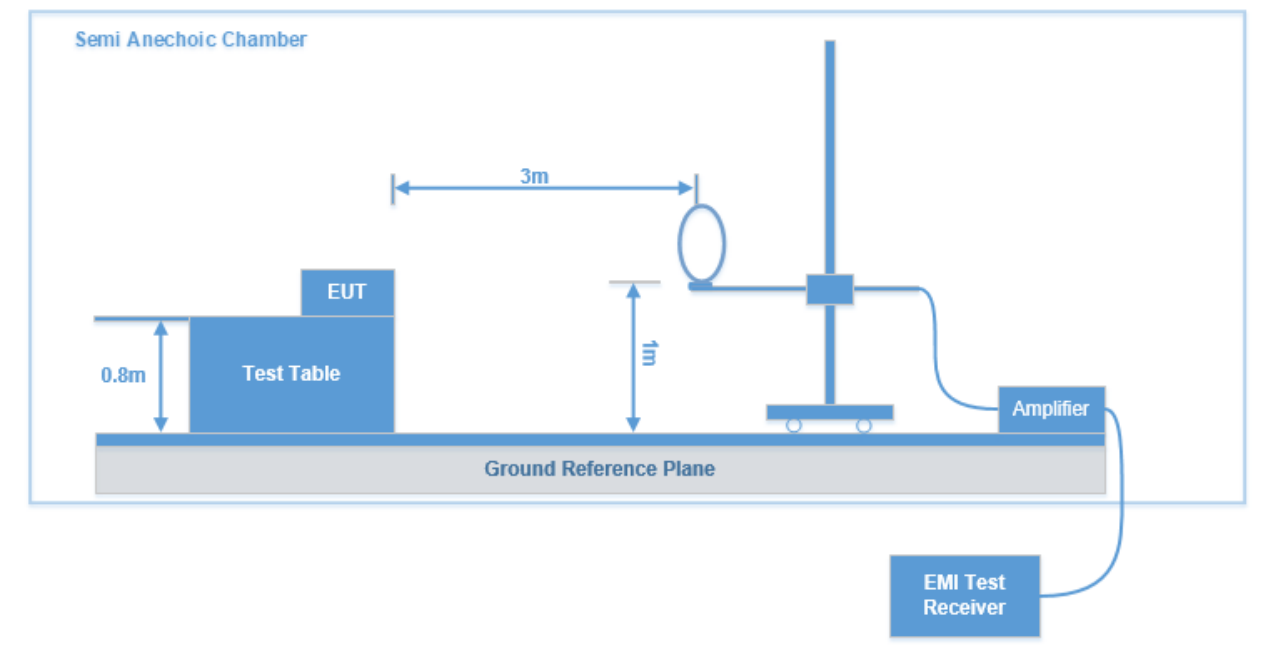
FCC §15.209, §15.205 & §15.247(d) - SPURIOUS EMISSIONS

Applicable Standard

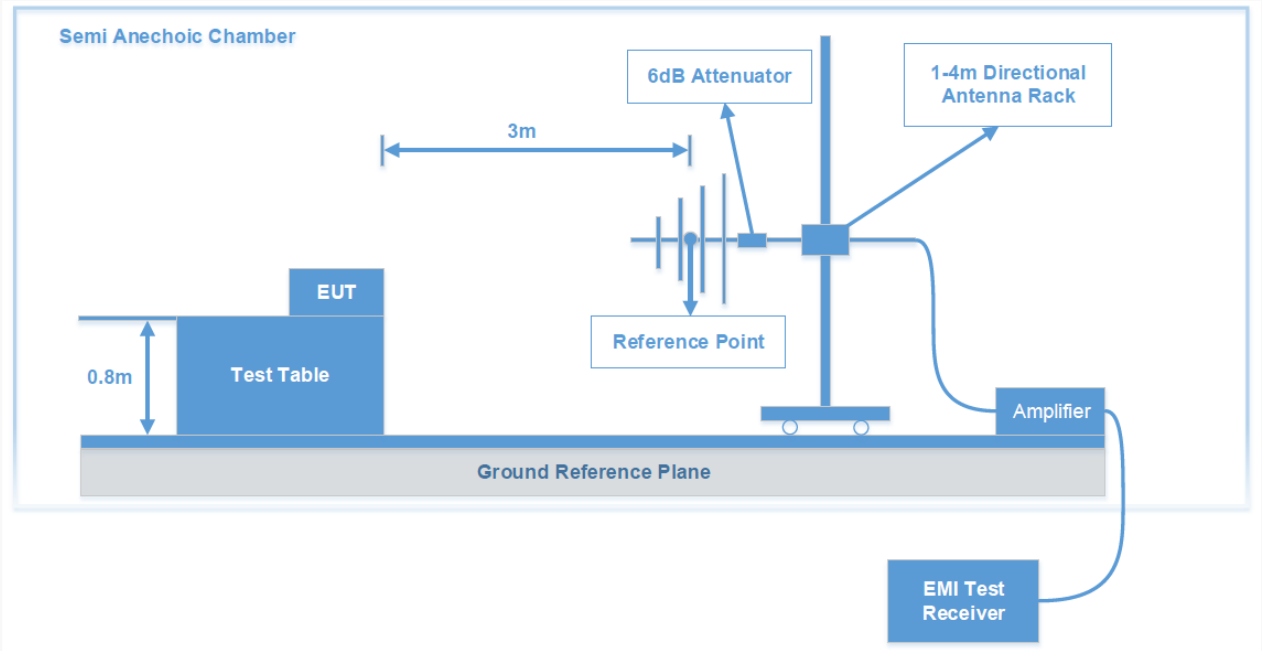
FCC §15.247 (d); §15.209; §15.205;

Test System Setup

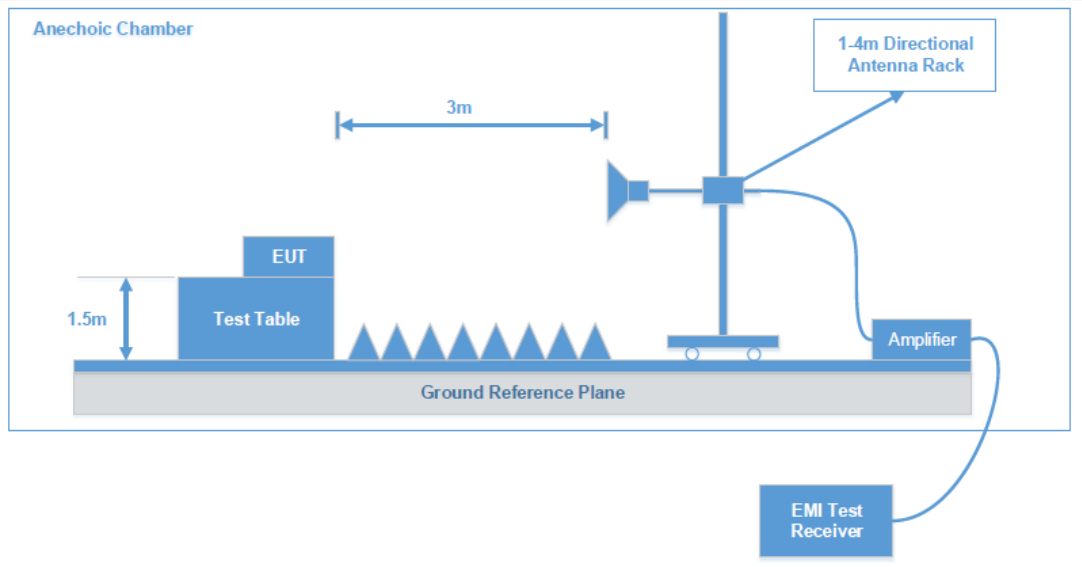
9 kHz – 30 MHz:



30 MHz - 1 GHz:



Above 1GHz:



The radiated emission tests were performed in the 3 meters test site, using the setup accordance with the ANSI C63.10-2013. The specification used was the FCC 15.209, and FCC 15.247 limits.

EMI Test Receiver Setup

The system was investigated from 9 kHz to 25 GHz.

During the radiated emission test, the EMI test receiver setup was set with the following configurations:

Frequency Range	RBW	VBW	IF B/W	Measurement
9 kHz – 150 kHz	200 Hz	1 kHz	200 Hz	QP/Average
150 kHz – 30 MHz	9 kHz	30 kHz	9 kHz	QP/ Average
30 MHz – 1000 MHz	100 kHz	300 kHz	/	Peak
	/	/	120 kHz	QP
Above 1GHz	1MHz	3 MHz	/	Peak
	1MHz	3 MHz	/	Average

Test Procedure

According to ANSI C63.10-2013 clause 6.5, 6.6 and 6.7.

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

If the measured peak level of the emissions that the measuring receiver reading level plus corrected factor is at least 6 dB below the QP emission limit, there's no need to record the measured QP level of the emissions in the report.

For 9 kHz-30MHz test, the lowest height of the magnetic antenna shall be 1 m above the ground and three antenna orientations (parallel, perpendicular, and ground-parallel) shall be measured.

Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading. The basic equation is as follows:

Corrected Amplitude (dBμV/m) = Meter Reading (dBμV) + Antenna Factor (dB/m) + Cable Loss (dB) - Amplifier Gain (dB)

The “Margin” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7dB means the emission is 7dB below the limit. The equation for margin calculation is as follows:

Margin (dB) = Limit (dBμV/m) – Corrected Amplitude (dBμV/m)

Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Title 47, Part 15, Subpart C, section 15.205, 15.209 and 15.247.

Test Data: See Appendix

FCC §15.247(A) (2) - 6 DB EMISSION BANDWIDTH

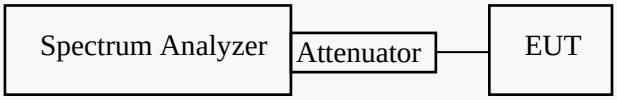
Applicable Standard

Systems using digital modulation techniques may operate in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

Test Procedure

According to ANSI C63.10-2013 sub-clause 11.8.1

1. Set RBW = 100 kHz.
2. Set the video bandwidth (VBW) ≥ 3 * RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.



Test Data: See Appendix

FCC §15.247(B) (3) - MAXIMUM CONDUCTED OUTPUT POWER

Applicable Standard

According to FCC §15.247(b) (3), for systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, Compliant with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.

Test Procedure

According to ANSI C63.10-2013 sub-clause 11.9.1.3

The maximum peak conducted output power may be measured using a broadband peak RF power meter. The power meter shall have a video bandwidth that is greater than or equal to the DTS bandwidth and shall use a fast-responding diode detector.

1. Place the EUT on a bench and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to one test equipment.
3. Add a correction factor to the display.

11.9.2.3.2 Method AVGPM-G
Method AVGPM-G is a measurement using a gated RF average power meter. Alternatively, measurements may be performed using a wideband gated RF power meter provided that the gate parameters are adjusted such that the power is measured only when the EUT is transmitting at its maximum power control level. Because the measurement is made only during the ON time of the transmitter, no duty cycle correction factor is required.

According to ANSI C63.10-2013 sub-clause 11.9.1.1

Test Data: See Appendix

FCC §15.247(D) – 100 KHZ BANDWIDTH OF FREQUENCY BAND EDGE

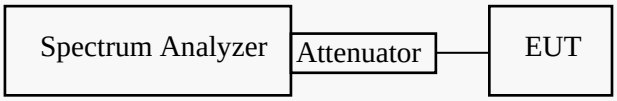
Applicable Standard

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates Compliant with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

Test Procedure

According to ANSI C63.10-2013 sub-clause 6.10.

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Set RBW to 100 kHz and VBW of spectrum analyzer to 300 kHz with a convenient frequency span including 100 kHz bandwidth from band edge.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.



Test Data: See Appendix

FCC §15.247(E) - POWER SPECTRAL DENSITY

Applicable Standard

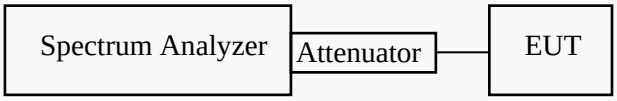
For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

Test Procedure

According to ANSI C63.10-2013 sub-clause 11.10.2

The following procedure shall be used if maximum peak conducted output power was used to determine Compliant, and it is optional if the maximum conducted (average) output power was used to determine Compliant:

1. Set the RBW to: 3kHz≤ RBW≤100 kHz.
2. Set the VBW ≥ 3*RBW.
3. Set the span to 1.5 times the DTS bandwidth.
4. Detector = peak.
5. Sweep time = auto couple.
6. Trace mode = max hold.
7. Allow trace to fully stabilize.
8. Use the peak marker function to determine the maximum amplitude level within the RBW.
9. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.



Test Data: See Appendix

APPENDIX - TEST DATA

Environmental Conditions & Test Information

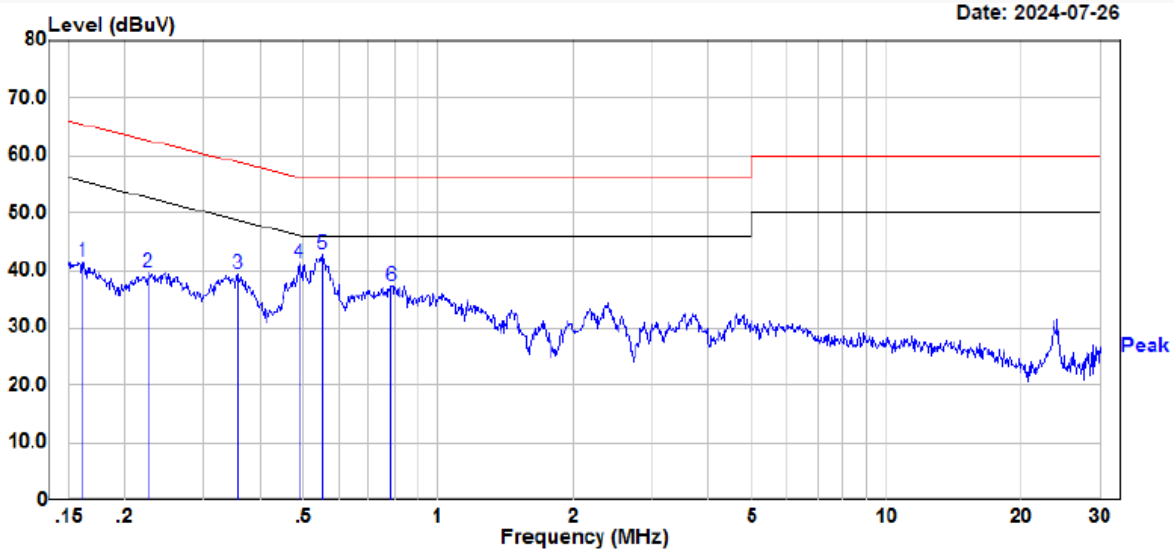
Test Item:	AC LINE CONDUCTED EMISSIONS	RADIATED EMISSIONS		
		9 kHz-1 GHz	1 GHz - 18 GHz	18 GHz -25 GHz
Test Date:	2024-07-26	2024-07-30 to 2024-10-31	2024-07-31	2024-07-23
Temperature:	24.7 ℃	20.5-25.2 ℃	24.9 ℃	25.3 ℃
Relative Humidity:	46 %	56-64 %	58 %	58 %
ATM Pressure:	99.9 kPa	100.8-102.0 kPa	100.3 kPa	100.4 kPa
Test Result:	Pass	Pass	Pass	Pass
Test Engineer:	Hardy Huang	Grace Luo & Jerry Yan	Klein Zhu & Hugh Wu	Hugh Wu

Test Item:	6 DB EMISSION BANDWIDTH	OCCUPIED BANDWIDTH	POWER SPECTRAL DENSITY	TRANSMITTER OUTPUT POWER MEASUREMENT	OUT OF BAND EMISSIONS	DUTY CYCLE
Test Date:	2024-06-21	2024-06-21	2024-06-21 to 2024-06-22	2024-06-21	2024-06-21	2024-06-21
Temperature:	22.5 ℃	22.5 ℃	22.5-23.7 ℃	22.5 ℃	22.5 ℃	22.5 ℃
Relative Humidity:	52 %	52 %	52-54 %	52 %	52 %	52 %
ATM Pressure:	100.8 kPa	100.8 kPa	100.6-100.8 kPa	100.8 kPa	100.8 kPa	100.8 kPa
Test Result:	Pass	/	Pass	Pass	Pass	/
Test Engineer:	Bard Liu	Bard Liu	Bard Liu	Bard Liu	Bard Liu	Bard Liu

AC LINE CONDUCTED EMISSIONS

EUT operation mode: Transmitting in maximum output power mode 802.11n20 mode low channel

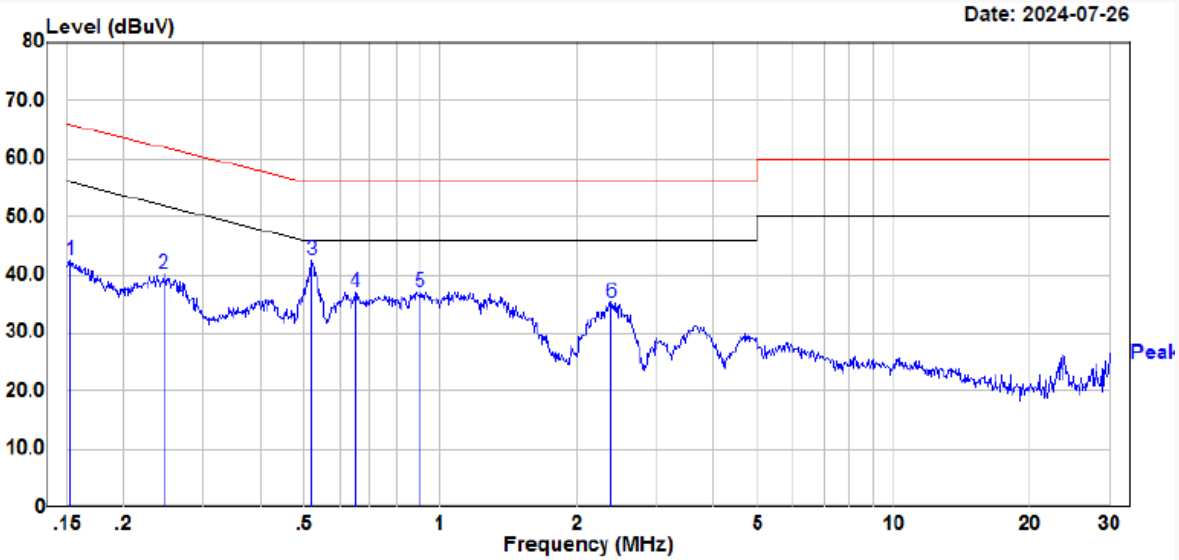
Line:




```
Site                : CE
Condition           : FCC PART 15.207
                    : DET:Peak
Project No.         : RKSA240425001
Model               : X1
Phase               : L
Voltage             : 120V/60Hz
Mode                : 2.4G WiFi
Test Equipment      : ENV216,ESR
Temperature         : 24.7℃
Humidity            : 46%
Atmospheric pressure: 99.9kPa
Test Engineer       : Hardy Huang
```

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.160	21.46	20.11	41.57	65.46	-23.89	Peak
2	0.225	19.59	20.13	39.72	62.65	-22.93	Peak
3	0.357	19.12	20.19	39.31	58.80	-19.49	Peak
4	0.489	21.08	20.16	41.24	56.19	-14.95	Peak
5	0.551	22.67	20.11	42.78	56.00	-13.22	Peak
6	0.785	17.36	19.96	37.32	56.00	-18.68	Peak

Neutral:




```
Site                : CE
Condition           : FCC PART 15.207
                    : DET:Peak
Project No.         : RKSA240425001
Model               : X1
Phase               : N
Voltage             : 120V/60Hz
Mode                : 2.4G WiFi
Test Equipment      : ENV216,ESR
Temperature         : 24.7℃
Humidity            : 46%
Atmospheric pressure: 99.9kPa
Test Engineer       : Hardy Huang
```

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.152	22.46	20.12	42.58	65.88	-23.30	Peak
2	0.244	19.91	20.13	40.04	61.94	-21.90	Peak
3	0.519	22.40	20.12	42.52	56.00	-13.48	Peak
4	0.649	17.02	20.08	37.10	56.00	-18.90	Peak
5	0.902	17.28	19.82	37.10	56.00	-18.90	Peak
6	2.385	15.16	20.19	35.35	56.00	-20.65	Peak

SPURIOUS EMISSIONS

Test Result: Compliant

EUT operation mode: Transmitting
After pre-scan in the X, Y and Z axes of orientation, the worst case in the Y axes of orientation is below:

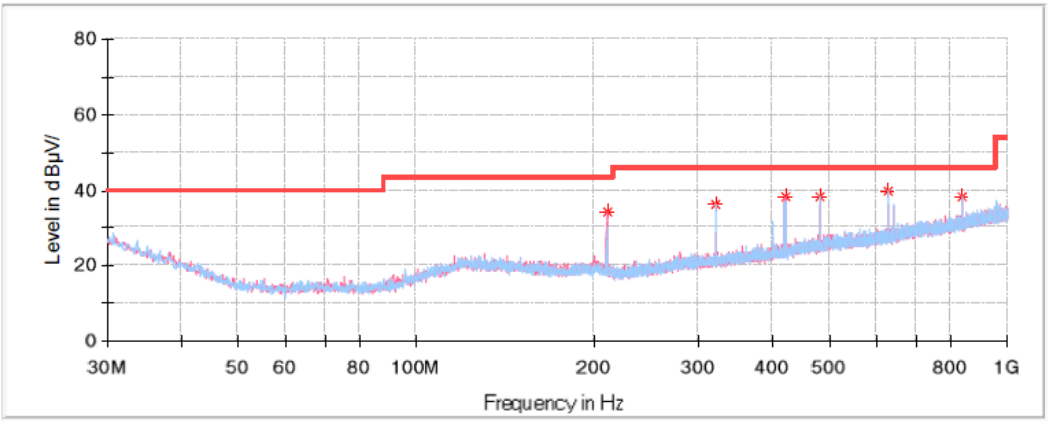
9 kHz-30MHz: *Transmitting in maximum output power 802.11n20 mode and low channel*

The amplitude of spurious emissions attenuated more than 20 dB below the limit was not be recorded.

Model: X1
30MHz-1GHz (802.11n20 mode is worst case):
Low channel: 2412MHz

Common Information

Project No:	RKSA240425001
EUT Model:	X1
Test Mode:	2.4G WIFI
Standard:	FCC Part 15.247 & FCC Part 15.205 & FCC Part 15.209
Test Equipment:	ESCI, JB3, 310N
Temperature:	25.2℃
Humidity:	56%
Barometric Pressure:	100.8kPa
Test Engineer:	Grace Luo
Test Date:	2024/7/30



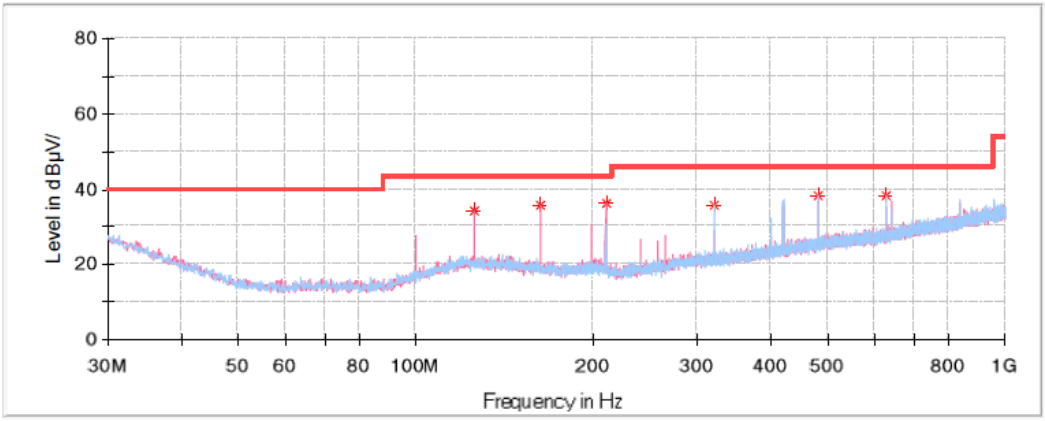
Critical_Freqs

Frequency (MHz)	MaxPeak (dBµ V/m)	Limit (dBµ V/m)	Margin (dB)	Pol	Corr. (dB/m)
209.935000	34.00	43.50	9.50	V	-12.8
320.030000	36.38	46.00	9.62	H	-10.0
420.061250	38.00	46.00	8.00	V	-7.5
480.080000	38.20	46.00	7.80	H	-5.9
630.066250	39.96	46.00	6.04	H	-3.6
840.192500	38.00	46.00	8.00	H	-0.1

Middle channel: 2437MHz

Common Information

Project No:	RKSA240425001
EUT Model:	X1
Test Mode:	2.4G WIFI
Standard:	FCC Part 15.247 & FCC Part 15.205 & FCC Part 15.209
Test Equipment:	ESCI, JB3, 310N
Temperature:	25.2℃
Humidity:	56%
Barometric Pressure:	100.8kPa
Test Engineer:	Grace Luo
Test Date:	2024/7/30



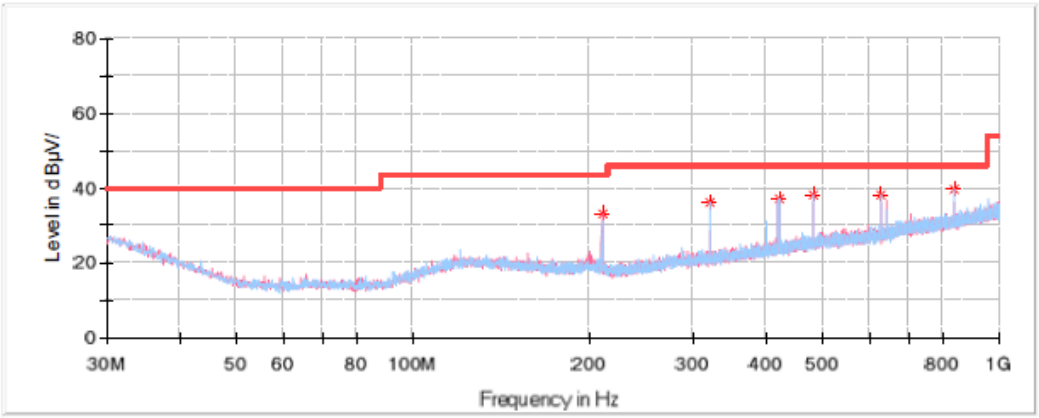
Critical_Freqs

Frequency (MHz)	MaxPeak (dBµ V/m)	Limit (dBµ V/m)	Margin (dB)	Pol	Corr. (dB/m)
125.545000	34.00	43.50	9.50	V	-11.0
163.011250	35.72	43.50	7.78	V	-12.3
209.935000	36.10	43.50	7.40	V	-12.8
320.030000	35.77	46.00	10.23	H	-10.0
479.958750	38.00	46.00	8.00	H	-5.9
630.066250	38.32	46.00	7.68	H	-3.6

High Channel: 2462MHz

Common Information

Project No:	RKSA240425001
EUT Model:	X1
Test Mode:	2.4G WIFI
Standard:	FCC Part 15.247 & FCC Part 15.205 & FCC Part 15.209
Test Equipment:	ESCI, JB3, 310N
Temperature:	25.2℃
Humidity:	56%
Barometric Pressure:	100.8kPa
Test Engineer:	Grace Luo
Test Date:	2024/7/30



Critical_Freqs

Frequency (MHz)	MaxPeak (dBµ V/m)	Limit (dBµ V/m)	Margin (dB)	Pol	Corr. (dB/m)
210.056250	33.00	43.50	10.50	V	-12.8
320.030000	35.98	46.00	10.02	H	-10.0
420.061250	37.00	46.00	9.00	V	-7.5
479.958750	38.00	46.00	8.00	H	-5.9
630.066250	38.20	46.00	7.80	H	-3.6
839.950000	40.00	46.00	6.00	H	-0.1

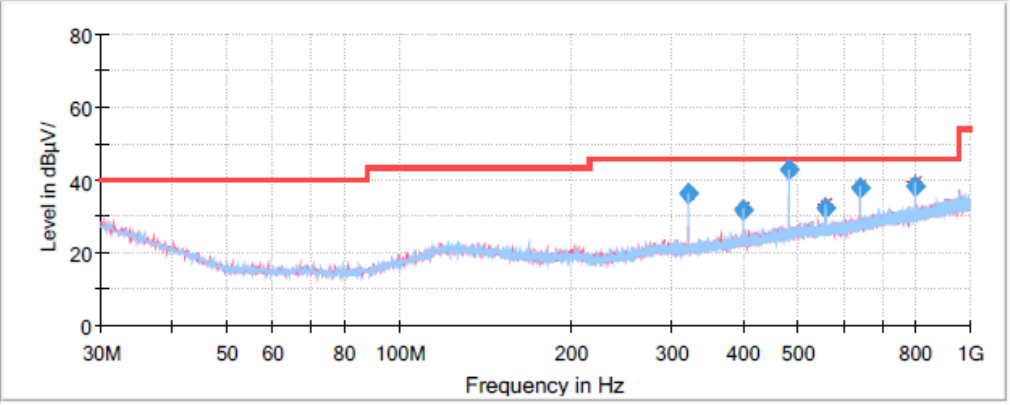
Model: X1 Lite

30MHz-1GHz (802.11n20 mode is worst case):

Low channel: 2412MHz

Common Information

Project No:	RKSA240425001
EUT Model:	X1 Lite
Test Mode:	2.4G WIFI
Standard:	FCC Part 15.247 & FCC Part 15.205 & FCC Part 15.209
Test Equipment:	ESCI, JB3, 310N
Temperature:	20.5℃
Humidity:	64%
Barometric Pressure:	102.0kPa
Test Engineer:	Jerry Yan
Test Date:	2024/10/31



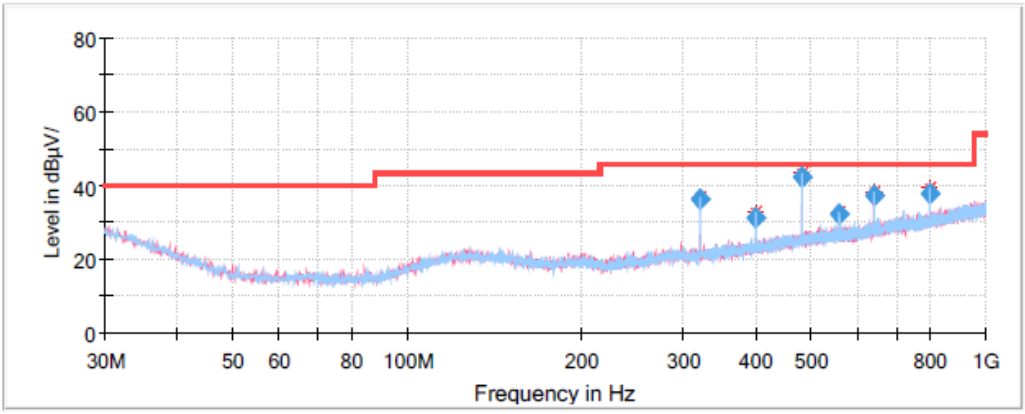
Final_Result

Frequency (MHz)	QuasiPeak (dBµ V/m)	Limit (dBµ V/m)	Margin (dB)	Pol	Corr. (dB/m)
319.991300	36.45	46.00	9.55	H	-10.0
400.013850	31.69	46.00	14.31	H	-8.0
479.985450	42.67	46.00	3.33	H	-5.9
559.981650	32.22	46.00	13.78	H	-4.7
639.995550	37.74	46.00	8.26	H	-3.3
799.999950	38.13	46.00	7.87	H	-0.8

Middle channel: 2437MHz

Common Information

Project No:	RKSA240425001
EUT Model:	X1 Lite
Test Mode:	2.4G WIFI
Standard:	FCC Part 15.247 & FCC Part 15.205 & FCC Part 15.209
Test Equipment:	ESCI, JB3, 310N
Temperature:	20.5℃
Humidity:	64%
Barometric Pressure:	102.0kPa
Test Engineer:	Jerry Yan
Test Date:	2024/10/31



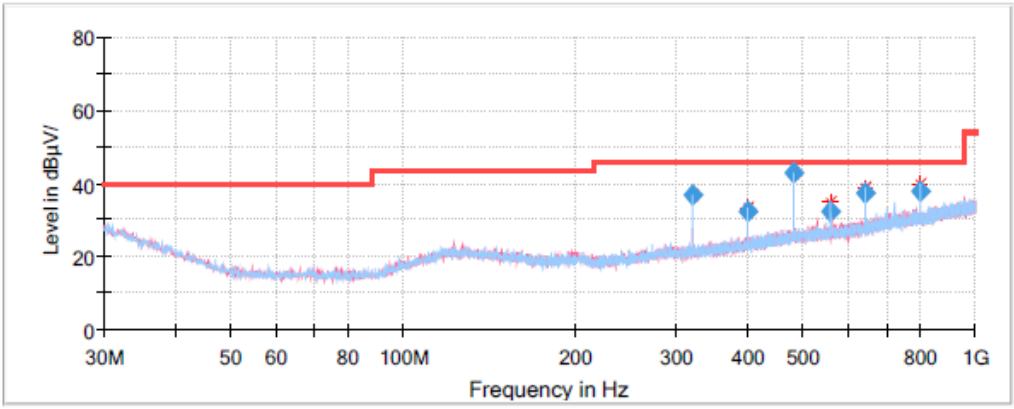
Final_Result

Frequency (MHz)	QuasiPeak (dBµ V/m)	Limit (dBµ V/m)	Margin (dB)	Pol	Corr. (dB/m)
320.006600	36.24	46.00	9.76	H	-10.0
400.019250	31.38	46.00	14.62	H	-8.0
479.982750	42.42	46.00	3.58	H	-5.9
559.983750	32.31	46.00	13.69	H	-4.7
640.006350	37.18	46.00	8.82	H	-3.3
799.991850	37.94	46.00	8.06	H	-0.8

High Channel: 2462MHz

Common Information

Project No:	RKSA240425001
EUT Model:	X1 Lite
Test Mode:	2.4G WIFI
Standard:	FCC Part 15.247 & FCC Part 15.205 & FCC Part 15.209
Test Equipment:	ESCI, JB3, 310N
Temperature:	20.5℃
Humidity:	64%
Barometric Pressure:	102.0kPa
Test Engineer:	Jerry Yan
Test Date:	2024/10/31



Final_Result

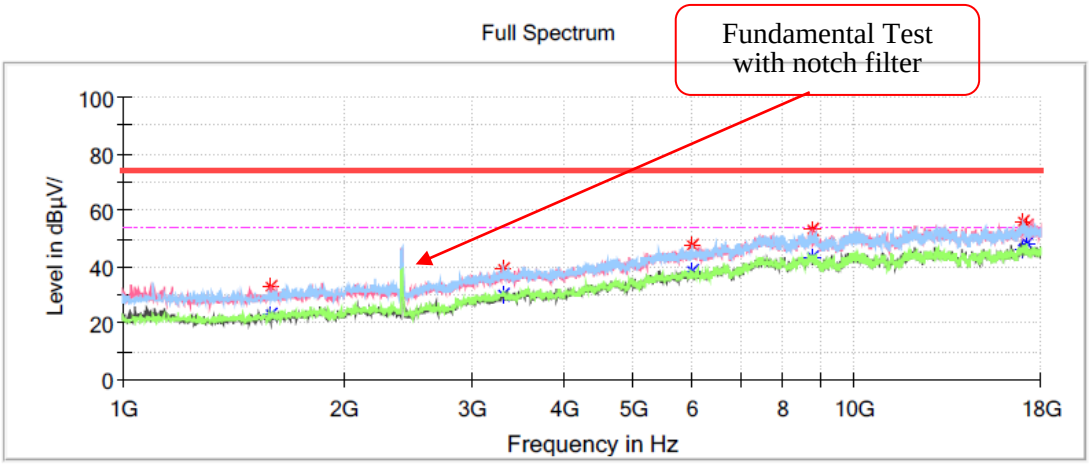
Frequency (MHz)	QuasiPeak (dBµ V/m)	Limit (dBµ V/m)	Margin (dB)	Pol	Corr. (dB/m)
319.997900	36.54	46.00	9.46	H	-10.0
400.002750	32.08	46.00	13.92	H	-8.0
480.004350	42.66	46.00	3.34	H	-5.9
559.998150	32.26	46.00	13.74	H	-4.7
640.013550	37.15	46.00	8.85	H	-3.3
799.986450	37.88	46.00	8.12	H	-0.8

1GHz-18GHz:
802.11b Mode:

Low Channel: 2412MHz

Common Information

Project No.:	RKSA240425001
Test Mode:	Transmitting in 802.11b mode low channel
Standard:	FCC Part 15.247 & FCC Part 15.205 & FCC Part 15.209
Test Engineer:	Klein Zhu



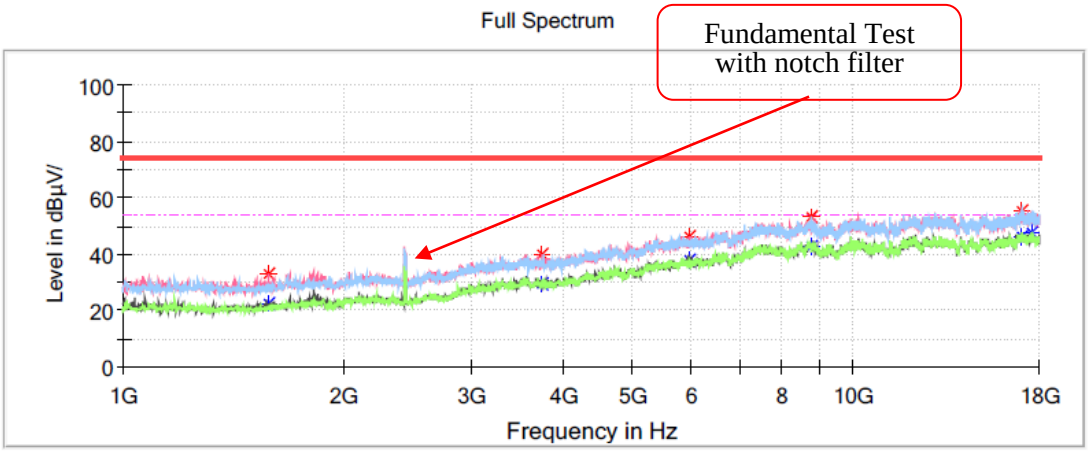
Critical_Freqs

Frequency (MHz)	MaxPeak (dB µ V/m)	Average (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Pol	Corr. (dB/m)
1596.700000	---	22.98	54.00	31.02	V	-14.2
1596.700000	32.90	---	74.00	41.10	V	-14.2
3320.500000	---	30.42	54.00	23.58	H	-7.1
3320.500000	39.37	---	74.00	34.63	H	-7.1
5999.700000	---	38.34	54.00	15.66	H	0.0
5999.700000	47.29	---	74.00	26.71	H	0.0
8746.900000	---	43.38	54.00	10.62	V	5.4
8746.900000	53.05	---	74.00	20.95	V	5.4
17048.000000	55.90	---	74.00	18.10	V	12.2
17048.000000	---	45.93	54.00	8.07	V	12.2
17277.500000	54.35	---	74.00	19.65	H	11.9
17277.500000	---	47.98	54.00	6.02	H	11.9

Middle Channel: 2437MHz

Common Information

Project No.:	RKSA240425001
Test Mode:	Transmitting in 802.11b mode middle channel
Standard:	FCC Part 15.247 & FCC Part 15.205 & FCC Part 15.209
Test Engineer:	Klein Zhu



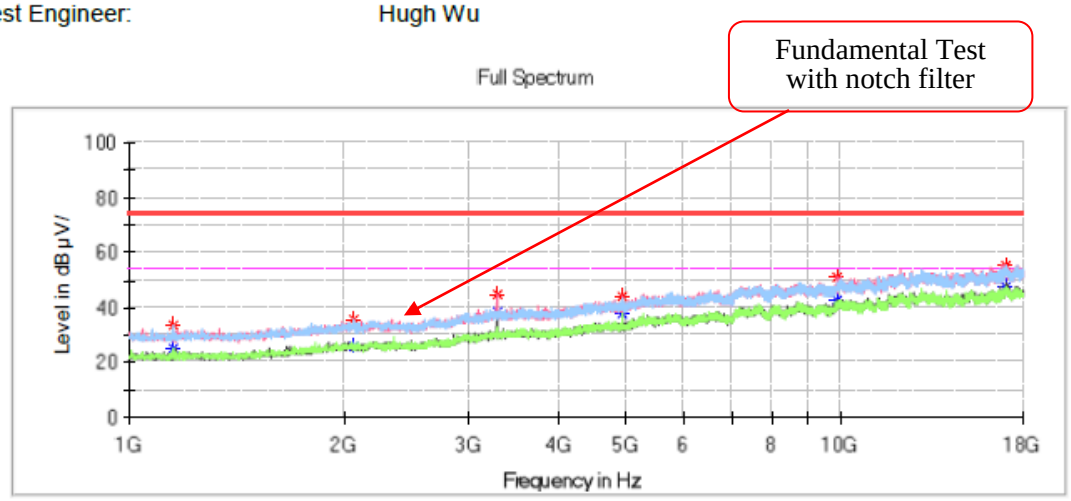
Critical_Freqs

Frequency (MHz)	MaxPeak (dB µ V/m)	Average (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Pol	Corr. (dB/m)
1584.800000	---	22.42	54.00	31.58	V	-14.2
1584.800000	32.88	---	74.00	41.12	V	-14.2
3750.600000	---	29.02	54.00	24.98	V	-6.1
3750.600000	40.10	---	74.00	33.90	V	-6.1
5982.700000	---	37.78	54.00	16.22	V	0.0
5982.700000	46.04	---	74.00	27.96	V	0.0
8748.600000	---	42.88	54.00	11.12	H	5.4
8748.600000	52.81	---	74.00	21.19	H	5.4
17051.400000	---	45.89	54.00	8.11	H	12.2
17051.400000	55.32	---	74.00	18.68	H	12.2
17532.500000	---	47.63	54.00	6.37	H	11.6
17532.500000	51.96	---	74.00	22.04	H	11.6

High Channel: 2462MHz

Common Information

Project No.:	RKSA240425001
Test Mode:	Transmitting in 802.11b mode high channel
Standard:	FCC Part 15.247 & FCC Part 15.205 & FCC Part 15.209
Test Engineer:	Hugh Wu



Critical_Freqs

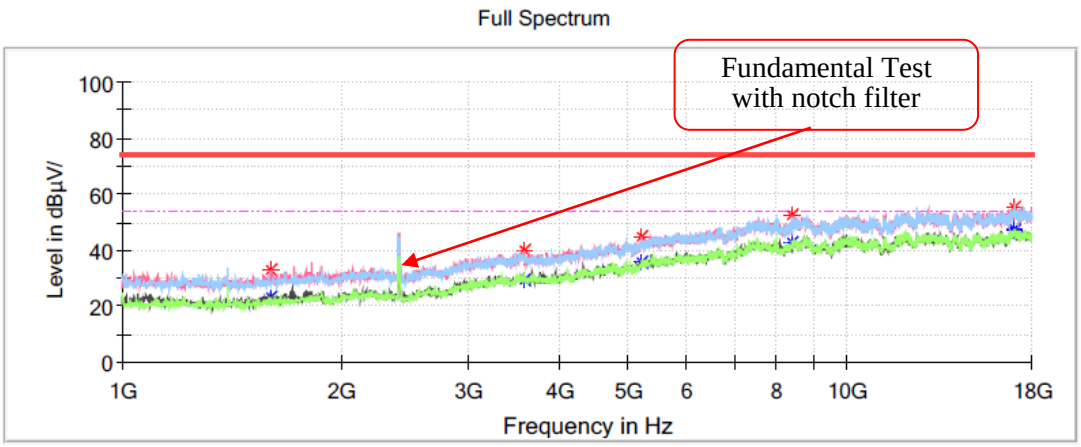
Frequency (MHz)	MaxPeak (dB µ V/m)	Average (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Pol	Corr. (dB/m)
1151.300000	33.70	---	74.00	40.30	H	-15.2
1151.300000	---	24.88	54.00	29.12	H	-15.2
2060.800000	35.72	---	74.00	38.28	V	-11.5
2060.800000	---	25.77	54.00	28.23	V	-11.5
3281.400000	---	38.80	54.00	15.20	V	-7.3
3281.400000	44.70	---	74.00	29.30	V	-7.3
4923.600000	---	38.07	54.00	15.93	V	-2.7
4923.600000	44.03	---	74.00	29.97	V	-2.7
9848.500000	---	42.31	54.00	11.69	V	6.5
9848.500000	51.23	---	74.00	22.77	V	6.5
17005.500000	---	47.35	54.00	6.65	V	12.3
17005.500000	55.57	---	74.00	18.43	V	12.3

802.11g Mode:

Low Channel: 2412MHz

Common Information

Project No.:	RKSA240425001
Test Mode:	Transmitting in 802.11g mode low channel
Standard:	FCC Part 15.247 & FCC Part 15.205 & FCC Part 15.209
Test Engineer:	Klein Zhu



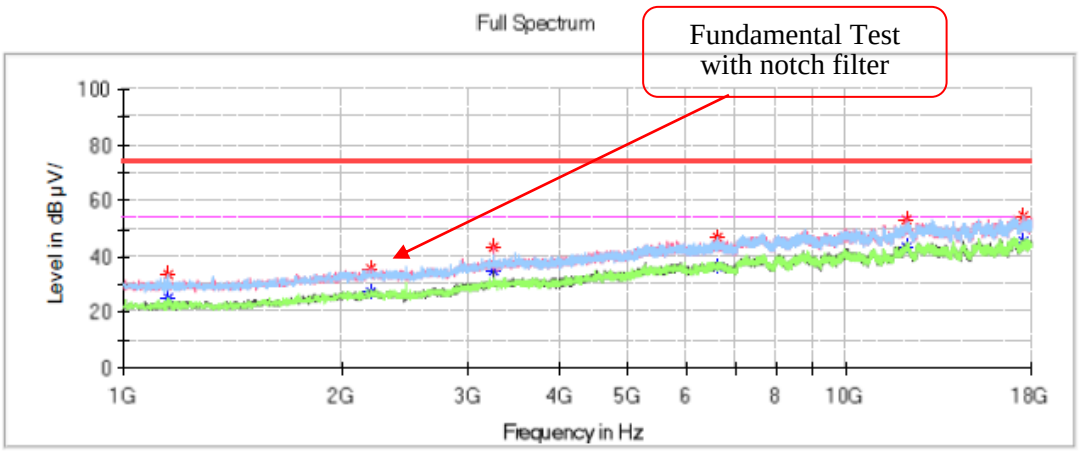
Critical_Freqs

Frequency (MHz)	MaxPeak (dB µ V/m)	Average (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Pol	Corr. (dB/m)
1601.800000	32.68	---	74.00	41.32	V	-14.1
1601.800000	---	22.77	54.00	31.23	V	-14.1
3597.600000	39.56	---	74.00	34.44	V	-6.3
3597.600000	---	29.66	54.00	24.34	V	-6.3
5205.800000	44.74	---	74.00	29.26	V	-1.6
5205.800000	---	35.73	54.00	18.27	V	-1.6
8398.400000	---	42.67	54.00	11.33	V	5.1
8398.400000	52.17	---	74.00	21.83	V	5.1
16971.500000	---	46.63	54.00	7.37	H	12.2
16971.500000	55.43	---	74.00	18.57	H	12.2
17022.500000	---	47.68	54.00	6.32	H	12.2
17022.500000	52.69	---	74.00	21.31	H	12.2

Middle Channel: 2437MHz

Common Information

Project No.:	RKSA240425001
Test Mode:	Transmitting in 802.11g mode middle channel
Standard:	FCC Part 15.247 & FCC Part 15.205 & FCC Part 15.209
Test Engineer:	Hugh Wu



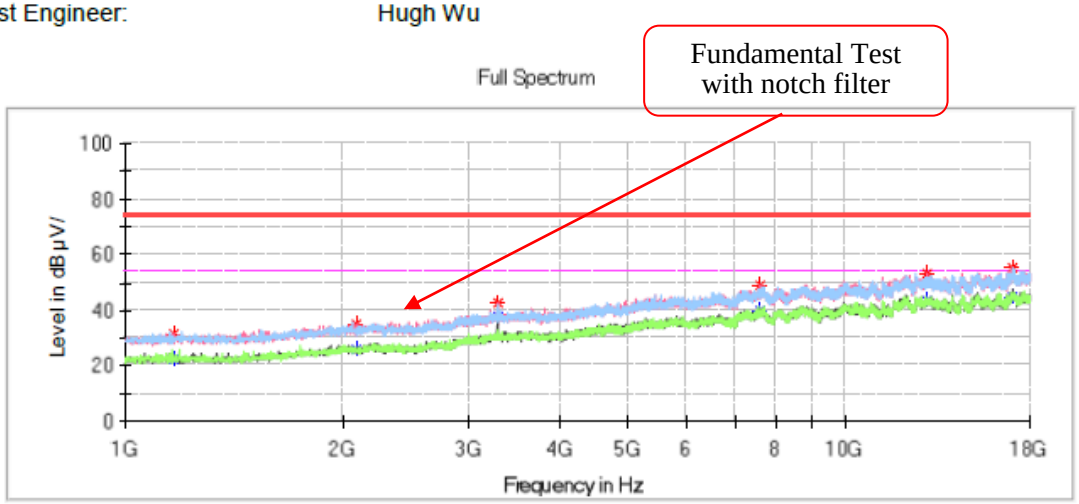
Critical_Freqs

Frequency (MHz)	MaxPeak (dB µ V/m)	Average (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Pol	Corr. (dB/m)
1151.300000	---	25.43	54.00	28.57	H	-15.2
1151.300000	33.24	---	74.00	40.76	H	-15.2
2203.600000	---	26.96	54.00	27.04	V	-11.1
2203.600000	35.82	---	74.00	38.18	V	-11.1
3249.100000	---	34.66	54.00	19.34	V	-7.4
3249.100000	43.18	---	74.00	30.82	V	-7.4
6644.000000	---	36.40	54.00	17.60	H	1.1
6644.000000	46.59	---	74.00	27.41	H	1.1
12065.300000	---	43.47	54.00	10.53	H	9.1
12065.300000	53.05	---	74.00	20.95	H	9.1
17554.600000	---	45.13	54.00	8.87	H	11.6
17554.600000	54.89	---	74.00	19.11	H	11.6

High Channel: 2462MHz

Common Information

Project No.:	RKSA240425001
Test Mode:	Transmitting in 802.11g mode high channel
Standard:	FCC Part 15.247 & FCC Part 15.205 & FCC Part 15.209
Test Engineer:	Hugh Wu



Critical_Freqs

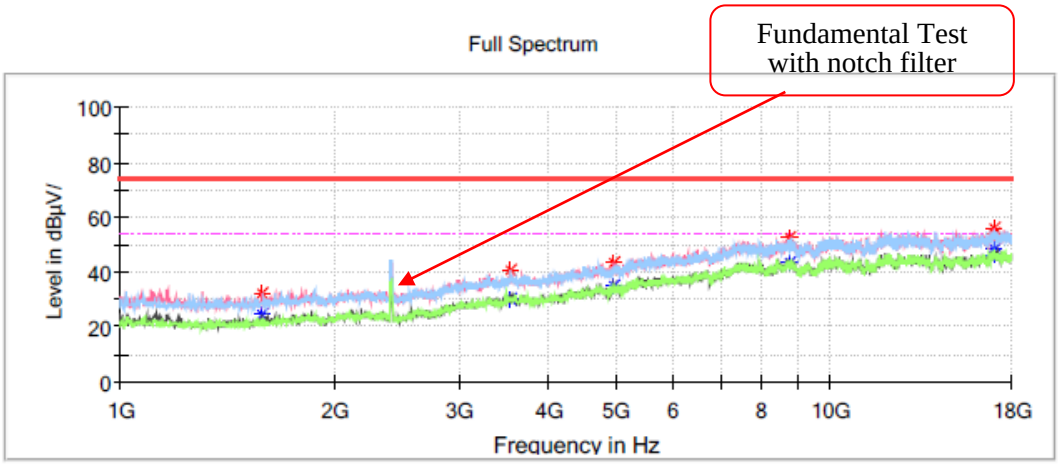
Frequency (MHz)	MaxPeak (dB µ V/m)	Average (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Pol	Corr. (dB/m)
1168.300000	---	22.34	54.00	31.66	V	-15.2
1168.300000	31.37	---	74.00	42.63	V	-15.2
2096.500000	---	25.57	54.00	28.43	V	-11.4
2096.500000	35.13	---	74.00	38.87	V	-11.4
3281.400000	42.95	---	74.00	31.05	V	-7.3
3281.400000	---	38.11	54.00	15.89	V	-7.3
7599.400000	---	40.09	54.00	13.91	V	3.9
7599.400000	49.20	---	74.00	24.80	V	3.9
12925.500000	---	43.05	54.00	10.95	V	9.7
12925.500000	53.26	---	74.00	20.74	V	9.7
17041.200000	---	44.85	54.00	9.15	H	12.2
17041.200000	55.23	---	74.00	18.77	H	12.2

802.11n-HT20 Mode :

Low Channel: 2412MHz

Common Information

Project No.:	RKSA240425001
Test Mode:	Transmitting in 802.11n20 mode low channel
Standard:	FCC Part 15.247 & FCC Part 15.205 & FCC Part 15.209
Test Engineer:	Klein Zhu



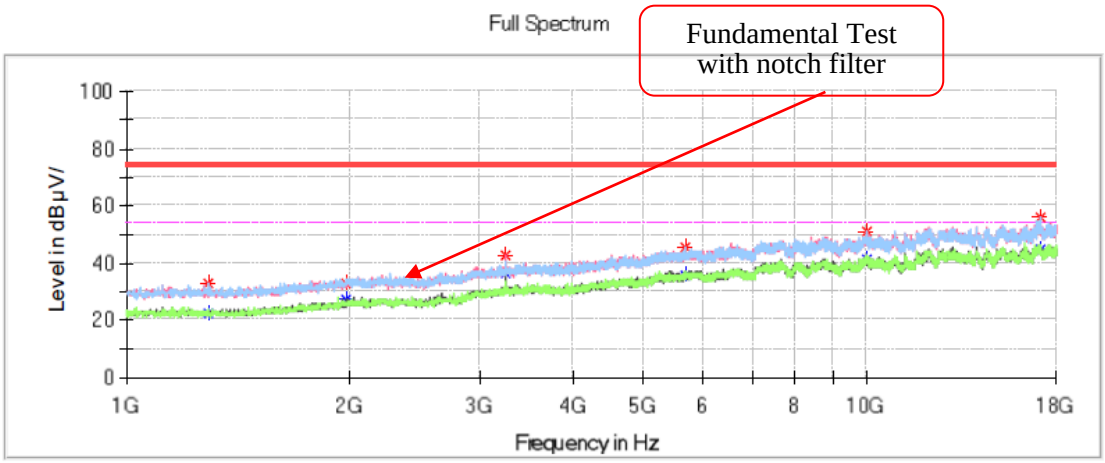
Critical_Freqs

Frequency (MHz)	MaxPeak (dB µ V/m)	Average (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Pol	Corr. (dB/m)
1581.400000	---	24.71	54.00	29.29	V	-14.2
1581.400000	32.32	---	74.00	41.68	V	-14.2
3541.500000	---	30.19	54.00	23.81	V	-6.3
3541.500000	40.31	---	74.00	33.69	V	-6.3
4940.600000	---	35.08	54.00	18.92	V	-2.7
4940.600000	43.44	---	74.00	30.56	V	-2.7
8748.600000	---	43.01	54.00	10.99	V	5.4
8748.600000	52.73	---	74.00	21.27	V	5.4
17014.000000	---	47.99	54.00	6.01	H	12.3
17014.000000	53.73	---	74.00	20.27	H	12.3
17041.200000	---	46.13	54.00	7.87	H	12.2
17041.200000	55.79	---	74.00	18.21	H	12.2

Middle Channel: 2437MHz

Common Information

Project No.:	RKSA240425001
Test Mode:	Transmitting in 802.11n20 mode middle channel
Standard:	FCC Part 15.247 & FCC Part 15.205 & FCC Part 15.209
Test Engineer:	Hugh Wu



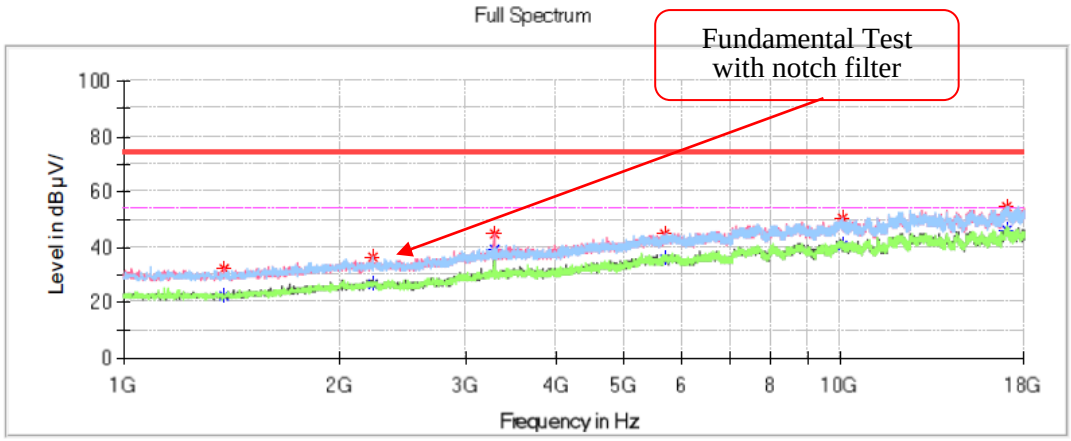
Critical_Freqs

Frequency (MHz)	MaxPeak (dB µ V/m)	Average (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Pol	Corr. (dB/m)
1287.300000	---	22.65	54.00	31.35	H	-15.0
1287.300000	33.08	---	74.00	40.92	H	-15.0
1975.800000	32.77	---	74.00	41.23	V	-11.9
1975.800000	---	27.19	54.00	26.81	V	-11.9
3249.100000	42.56	---	74.00	31.44	V	-7.4
3249.100000	---	36.02	54.00	17.98	V	-7.4
5666.500000	---	35.73	54.00	18.27	H	-0.2
5666.500000	45.65	---	74.00	28.35	H	-0.2
9998.100000	---	41.50	54.00	12.50	H	7.0
9998.100000	50.77	---	74.00	23.23	H	7.0
17082.000000	---	44.83	54.00	9.17	H	12.2
17082.000000	55.60	---	74.00	18.40	H	12.2

High Channel: 2462MHz

Common Information

Project No.:	RKSA240425001
Test Mode:	Transmitting in 802.11n20 mode high channel
Standard:	FCC Part 15.247 & FCC Part 15.205 & FCC Part 15.209
Test Engineer:	Hugh Wu



Critical_Freqs

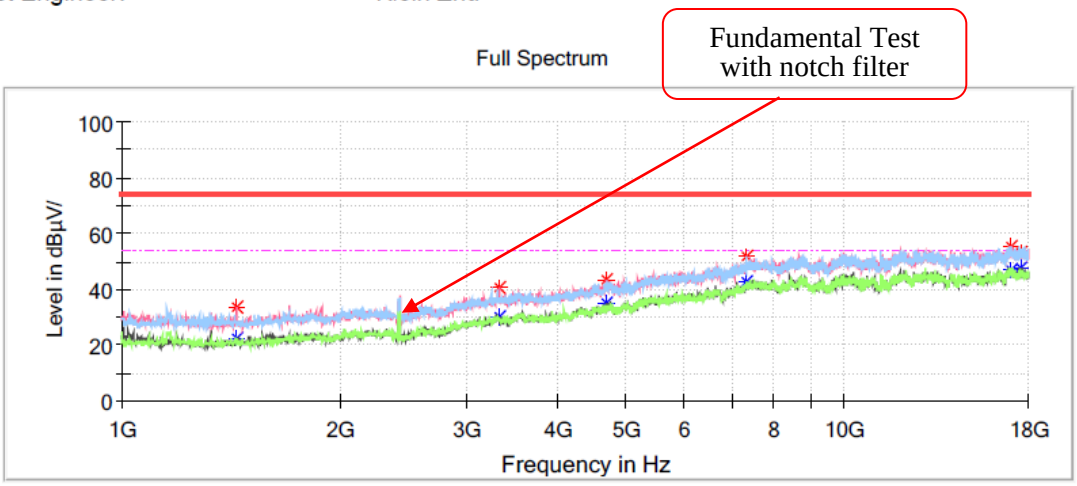
Frequency (MHz)	MaxPeak (dB µ V/m)	Average (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Pol	Corr. (dB/m)
1382.500000	---	22.18	54.00	31.82	V	-14.9
1382.500000	32.30	---	74.00	41.70	V	-14.9
2224.000000	---	26.73	54.00	27.27	H	-11.0
2224.000000	36.24	---	74.00	37.76	H	-11.0
3281.400000	44.98	---	74.00	29.02	V	-7.3
3281.400000	---	38.96	54.00	15.04	V	-7.3
5683.500000	---	35.72	54.00	18.28	V	-0.2
5683.500000	44.45	---	74.00	29.55	V	-0.2
10052.500000	---	40.73	54.00	13.27	H	7.1
10052.500000	50.54	---	74.00	23.46	H	7.1
17044.600000	---	46.47	54.00	7.53	H	12.2
17044.600000	54.52	---	74.00	19.48	H	12.2

802.11n-HT40 Mode :

Low Channel: 2422MHz

Common Information

Project No.:	RKSA240425001
Test Mode:	Transmitting in 802.11n40 mode middle channel
Standard:	FCC Part 15.247 & FCC Part 15.205 & FCC Part 15.209
Test Engineer:	Klein Zhu



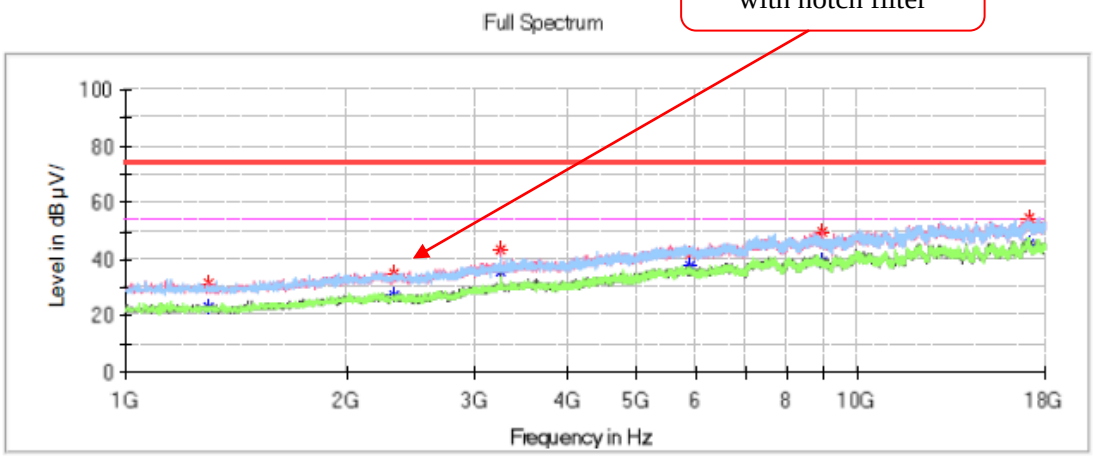
Critical_Freqs

Frequency (MHz)	MaxPeak (dB µ V/m)	Average (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Pol	Corr. (dB/m)
1440.300000	---	22.45	54.00	31.55	H	-14.8
1440.300000	33.69	---	74.00	40.31	H	-14.8
3325.600000	---	30.34	54.00	23.66	V	-7.1
3325.600000	40.45	---	74.00	33.55	V	-7.1
4678.800000	---	34.69	54.00	19.31	V	-3.6
4678.800000	43.35	---	74.00	30.65	V	-3.6
7339.300000	---	42.40	54.00	11.60	H	3.5
7339.300000	51.47	---	74.00	22.53	H	3.5
17036.100000	55.42	---	74.00	18.58	H	12.2
17036.100000	---	46.56	54.00	7.44	H	12.2
17552.900000	52.87	---	74.00	21.13	V	11.6
17552.900000	---	47.75	54.00	6.25	V	11.6

Middle Channel: 2437MHz

Common Information

Project No.:	RKSA240425001
Test Mode:	Transmitting in 802.11n40 mode middle channel
Standard:	FCC Part 15.247 & FCC Part 15.205 & FCC Part 15.209
Test Engineer:	Hugh Wu



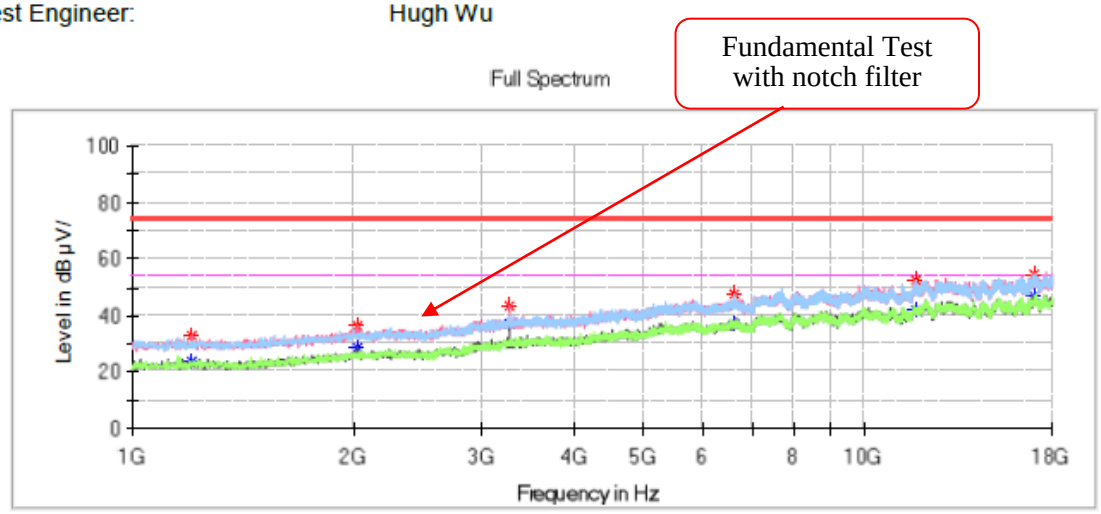
Critical_Freqs

Frequency (MHz)	MaxPeak (dB µ V/m)	Average (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Pol	Corr. (dB/m)
1300.900000	---	23.24	54.00	30.76	V	-15.0
1300.900000	31.29	---	74.00	42.71	V	-15.0
2324.300000	---	27.17	54.00	26.83	V	-10.7
2324.300000	35.04	---	74.00	38.96	V	-10.7
3249.100000	---	35.81	54.00	18.19	V	-7.4
3249.100000	43.18	---	74.00	30.82	V	-7.4
5909.600000	41.96	---	74.00	32.04	V	0.0
5909.600000	---	37.85	54.00	16.15	V	0.0
8905.000000	---	39.36	54.00	14.64	V	5.4
8905.000000	49.89	---	74.00	24.11	V	5.4
17092.200000	---	45.28	54.00	8.72	H	12.1
17092.200000	54.63	---	74.00	19.37	H	12.1

High Channel: 2452MHz

Common Information

Project No.:	RKSA240425001
Test Mode:	Transmitting in 802.11n40 mode low channel
Standard:	FCC Part 15.247 & FCC Part 15.205 & FCC Part 15.209
Test Engineer:	Hugh Wu

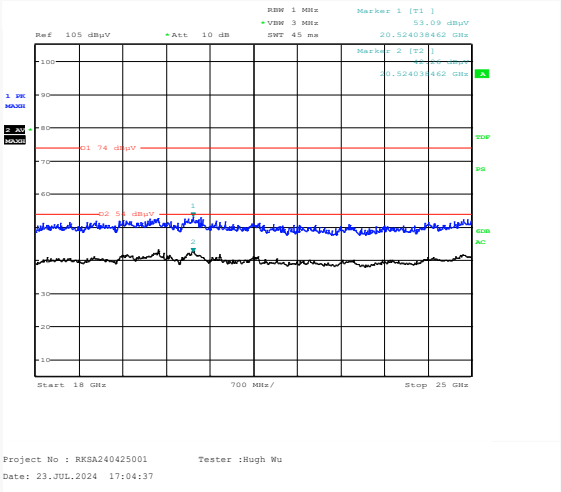


Critical_Freqs

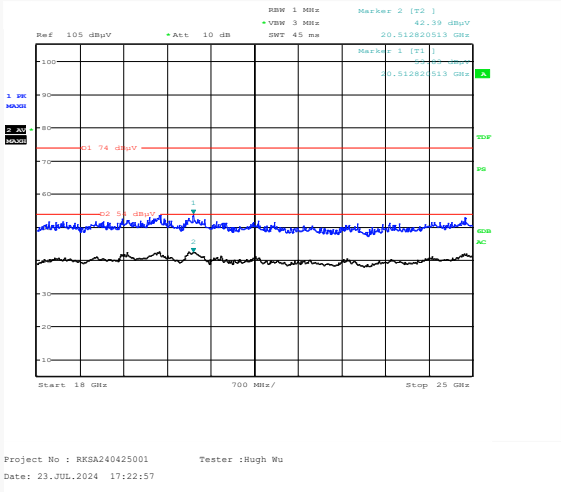
Frequency (MHz)	MaxPeak (dB µ V/m)	Average (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Pol	Corr. (dB/m)
1207.400000	---	23.62	54.00	30.38	V	-15.2
1207.400000	32.69	---	74.00	41.31	V	-15.2
2030.200000	36.65	---	74.00	37.35	V	-11.6
2030.200000	---	28.57	54.00	25.43	V	-11.6
3267.800000	43.55	---	74.00	30.45	V	-7.3
3267.800000	---	37.07	54.00	16.93	V	-7.3
6642.300000	---	37.34	54.00	16.66	H	1.1
6642.300000	47.54	---	74.00	26.46	H	1.1
11727.000000	---	41.99	54.00	12.01	H	8.9
11727.000000	52.58	---	74.00	21.42	H	8.9
17065.000000	---	47.03	54.00	6.97	V	12.2
17065.000000	54.88	---	74.00	19.12	V	12.2

18GHz-25GHz: Transmitting in 802.11n20 mode low channel is worst case

Horizontal



Vertical



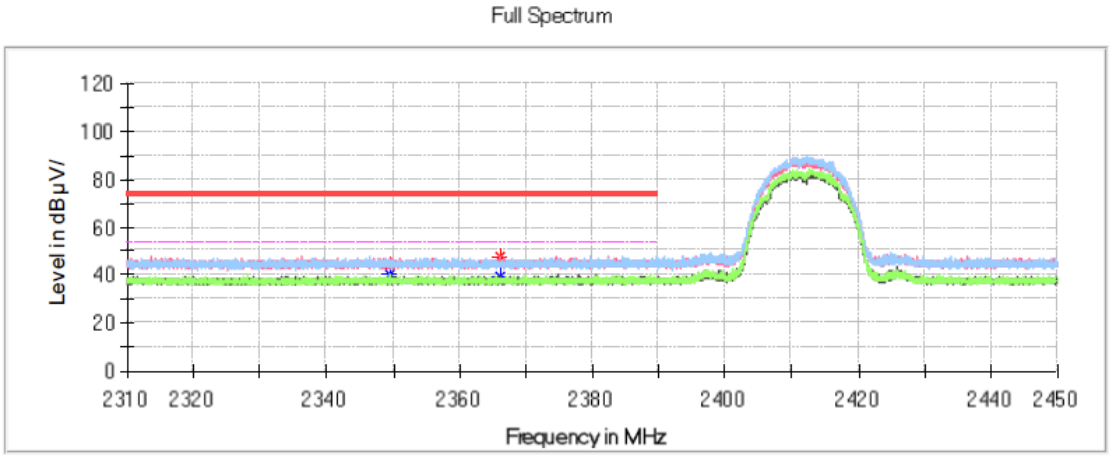
Note: The test distance is 3m. The limit is 74dBµV/m(Peak) and 54dBµV/m(Average).

Band Edge:
802.11b Mode:

Low Channel

Common Information

Project No.:	RKSA240425001
Test Mode:	Transmitting in 802.11b mode low channel
Standard:	FCC Part 15.247 & FCC Part 15.205 & FCC Part 15.209
Test Engineer:	Hugh Wu



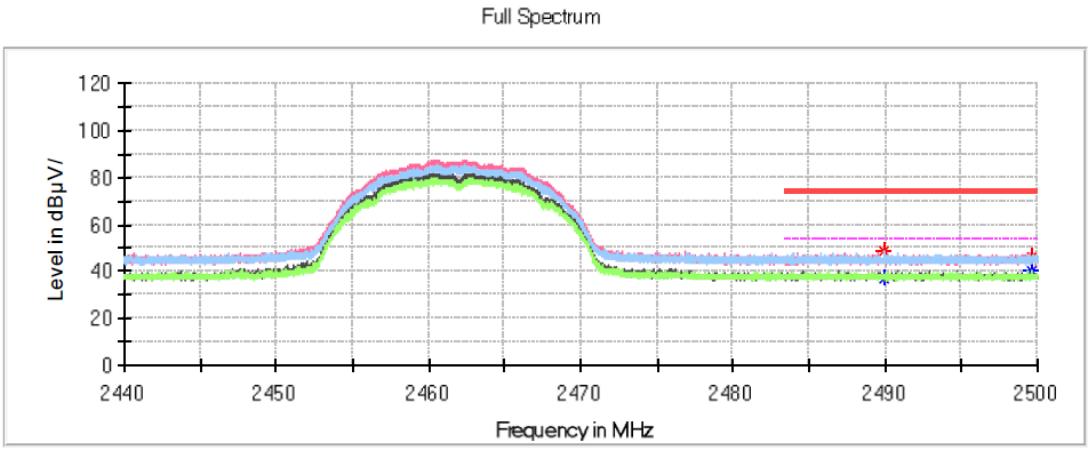
Critical_Freqs

Frequency (MHz)	MaxPeak (dB µ V/m)	Average (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Pol	Corr. (dB/m)
2349.592000	---	40.57	54.00	13.43	V	-0.7
2349.592000	44.48	---	74.00	29.52	V	-0.7
2366.224000	---	39.37	54.00	14.63	V	-0.7
2366.224000	48.02	---	74.00	25.98	V	-0.7

High Channel

Common Information

Project No.:	RKSA240425001
Test Mode:	Transmitting in 802.11b mode high channel
Standard:	FCC Part 15.247 & FCC Part 15.205 & FCC Part 15.209
Test Engineer:	Hugh Wu



Critical_Freqs

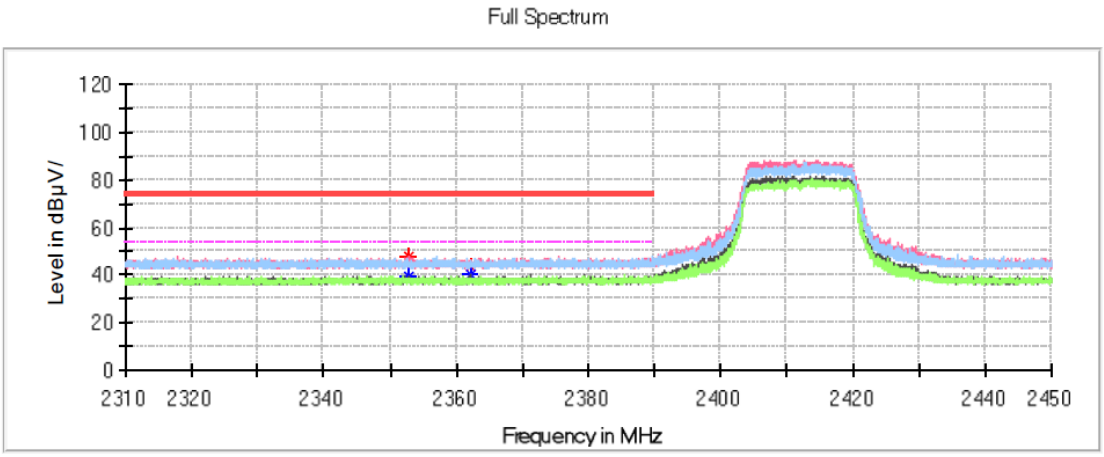
Frequency (MHz)	MaxPeak (dB µ V/m)	Average (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Pol	Corr. (dB/m)
2489.974000	48.79	---	74.00	25.21	H	-0.2
2489.974000	---	36.87	54.00	17.13	H	-0.2
2499.604000	45.97	---	74.00	28.03	H	-0.2
2499.604000	---	40.44	54.00	13.56	H	-0.2

802.11g Mode :

Low Channel

Common Information

Project No.:	RKSA240425001
Test Mode:	Transmitting in 802.11g mode low channel
Standard:	FCC Part 15.247 & FCC Part 15.205 & FCC Part 15.209
Test Engineer:	Hugh Wu



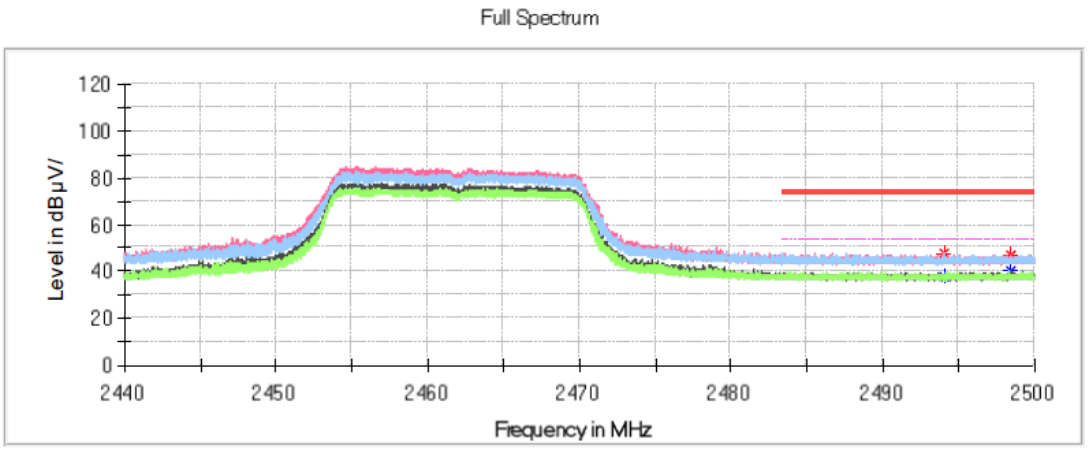
Critical_Freqs

Frequency (MHz)	MaxPeak (dB µ V/m)	Average (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Pol	Corr. (dB/m)
2352.700000	47.99	---	74.00	26.01	V	-0.7
2352.700000	---	39.21	54.00	14.79	V	-0.7
2362.108000	43.99	---	74.00	30.01	V	-0.7
2362.108000	---	40.21	54.00	13.79	V	-0.7

High Channel

Common Information

Project No.:	RKSA240425001
Test Mode:	Transmitting in 802.11g mode high channel
Standard:	FCC Part 15.247 & FCC Part 15.205 & FCC Part 15.209
Test Engineer:	Peter Wang



Critical_Freqs

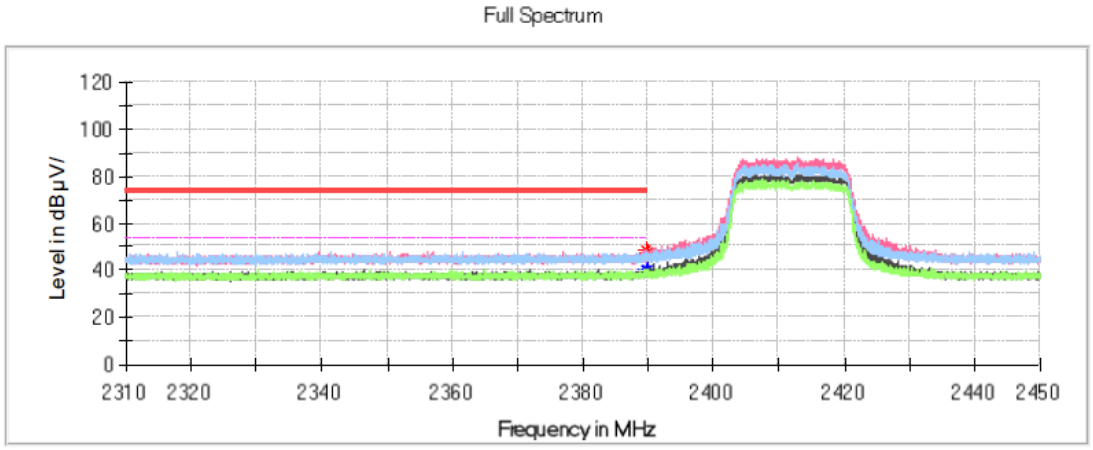
Frequency (MHz)	MaxPeak (dB µ V/m)	Average (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Pol	Corr. (dB)
2494.024000	47.88	---	74.00	26.12	H	-0.2
2494.024000	---	38.13	54.00	15.87	H	-0.2
2498.488000	46.87	---	74.00	27.13	V	-0.2
2498.488000	---	40.18	54.00	13.82	V	-0.2

802.11n-HT20 Mode:

Low Channel

Common Information

Project No.:	RKSA240425001
Test Mode:	Transmitting in 802.11n20 mode low channel
Standard:	FCC Part 15.247 & FCC Part 15.205 & FCC Part 15.209
Test Engineer:	Hugh Wu



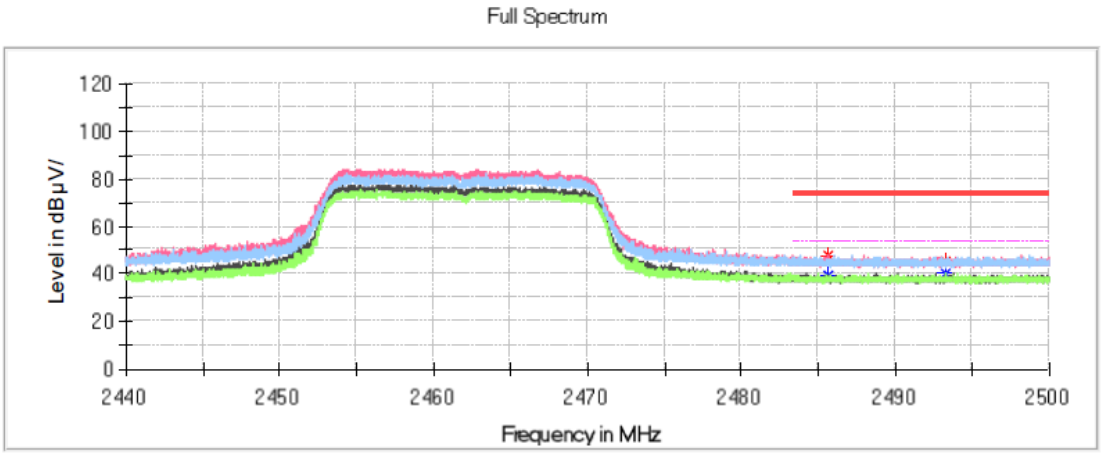
Critical_Freqs

Frequency (MHz)	MaxPeak (dB µ V/m)	Average (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Pol	Corr. (dB/m)
2389.702000	48.73	---	74.00	25.27	V	-0.6
2389.702000	---	40.24	54.00	13.76	V	-0.6
2389.870000	48.21	---	74.00	25.79	V	-0.6
2389.870000	---	40.68	54.00	13.32	V	-0.6

High Channel

Common Information

Project No.:	RKSA240425001
Test Mode:	Transmitting in 802.11n20 mode high channel
Standard:	FCC Part 15.247 & FCC Part 15.205 & FCC Part 15.209
Test Engineer:	Hugh Wu



Critical_Freqs

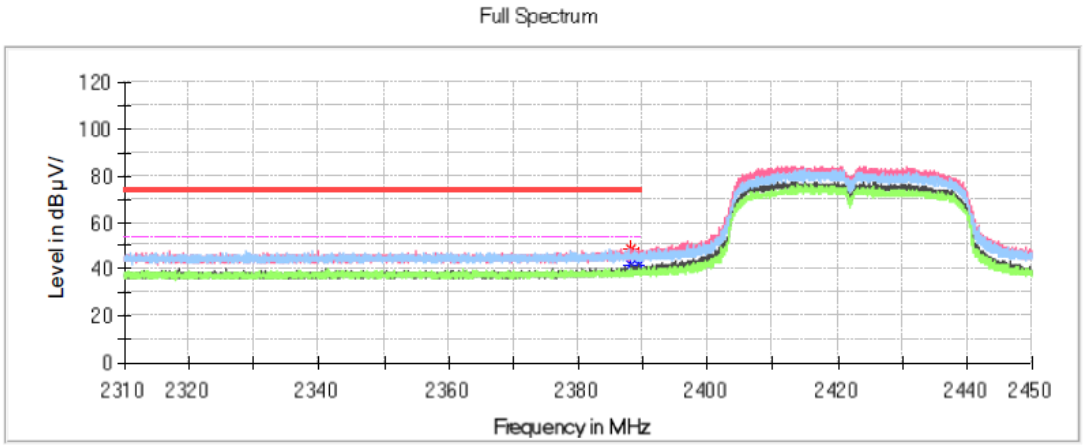
Frequency (MHz)	MaxPeak (dB µ V/m)	Average (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Pol	Corr (dB/m)
2485.642000	47.69	---	74.00	26.31	V	-0.2
2485.642000	---	39.33	54.00	14.67	V	-0.2
2493.280000	45.08	---	74.00	28.92	V	-0.2
2493.280000	---	40.52	54.00	13.48	V	-0.2

802.11n-HT40 Mode:

Low Channel

Common Information

Project No.:	RKSA240425001
Test Mode:	Transmitting in 802.11n40 mode low channel
Standard:	FCC Part 15.247 & FCC Part 15.205 & FCC Part 15.209
Test Engineer:	Hugh Wu



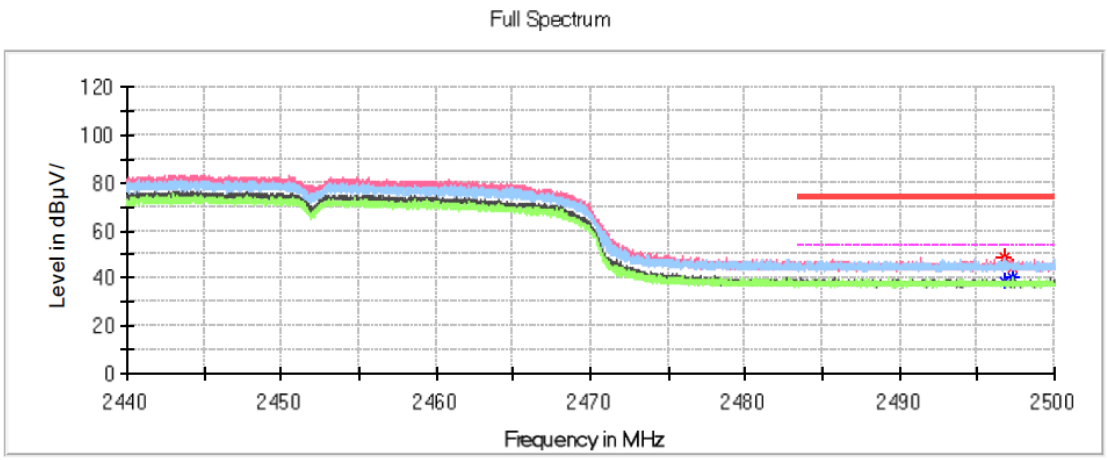
Critical_Freqs

Frequency (MHz)	MaxPeak (dB µ V/m)	Average (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Pol	Corr. (dB/m)
2388.078000	48.85	---	74.00	25.15	V	-0.6
2388.078000	---	41.80	54.00	12.20	V	-0.6
2389.478000	46.32	---	74.00	27.68	V	-0.6
2389.478000	---	41.85	54.00	12.15	V	-0.6

High Channel

Common Information

Project No.:	RKSA240425001
Test Mode:	Transmitting in 802.11n40 mode high channel
Standard:	FCC Part 15.247 & FCC Part 15.205 & FCC Part 15.209
Test Engineer:	Hugh Wu



Critical_Freqs

Frequency (MHz)	MaxPeak (dB µ V/m)	Average (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Pol	Corr. (dB/m)
2496.706000	48.37	---	74.00	25.63	H	-0.2
2496.706000	---	38.98	54.00	15.02	H	-0.2
2497.228000	44.58	---	74.00	29.42	H	-0.2
2497.228000	---	40.58	54.00	13.42	H	-0.2

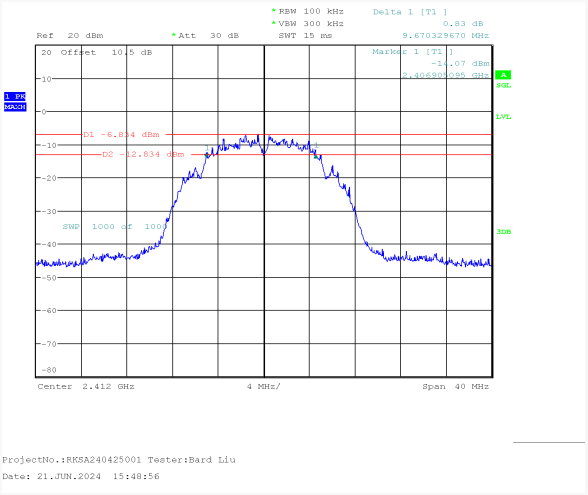
6 dB EMISSION BANDWIDTH

Test Result: Compliant.

EUT operation mode: Transmitting

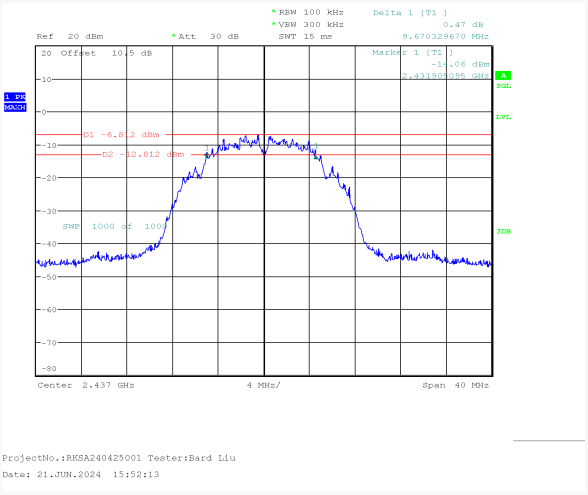
Channel	Frequency (MHz)	6 dB Emission Bandwidth (MHz)	Limit (MHz)
802.11b Mode			
Low	2412	9.670	≥0.5
Middle	2437	9.670	≥0.5
High	2462	9.670	≥0.5
802.11g Mode			
Low	2412	16.503	≥0.5
Middle	2437	16.503	≥0.5
High	2462	16.503	≥0.5
802.11n-HT20 Mode			
Low	2412	17.622	≥0.5
Middle	2437	17.463	≥0.5
High	2462	17.662	≥0.5
802.11n-HT40 Mode			
Low	2422	33.806	≥0.5
Middle	2437	33.806	≥0.5
High	2452	33.646	≥0.5

802.11b Mode Low Channel



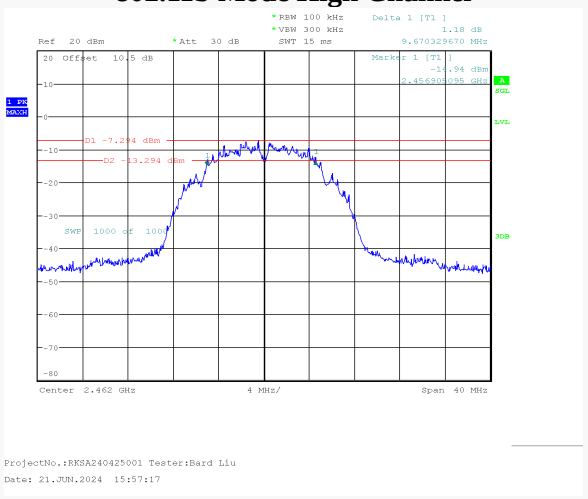
ProjectNo.:RKSA240425001 Tester:Bard Liu
Date: 21.JUN.2024 15:48:56

802.11b Mode Middle Channel



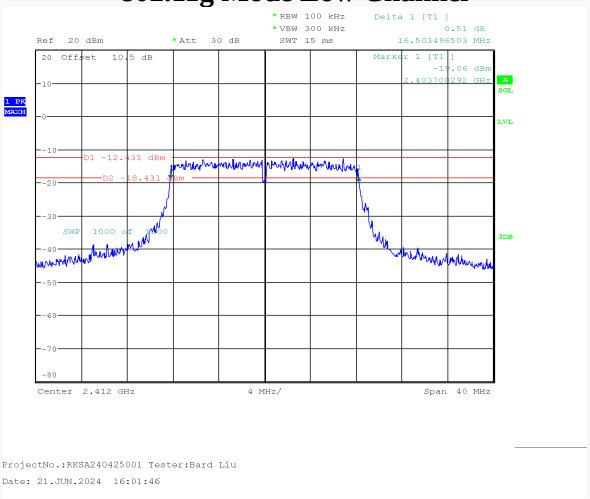
ProjectNo.:RKSA240425001 Tester:Bard Liu
Date: 21.JUN.2024 15:52:13

802.11b Mode High Channel



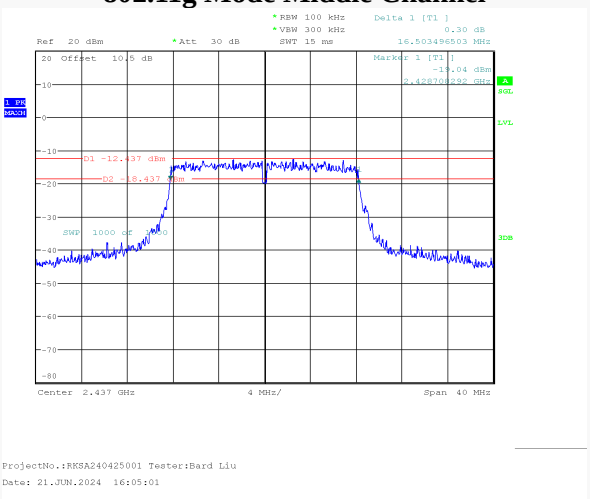
ProjectNo.:RKSA240425001 Tester:Bard Liu
Date: 21.JUN.2024 15:57:17

802.11g Mode Low Channel



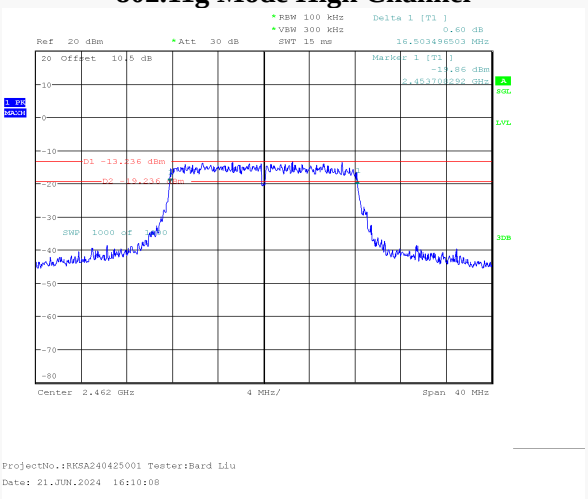
ProjectNo.:RKSA240425001 Tester:Bard Liu
Date: 21.JUN.2024 16:01:46

802.11g Mode Middle Channel



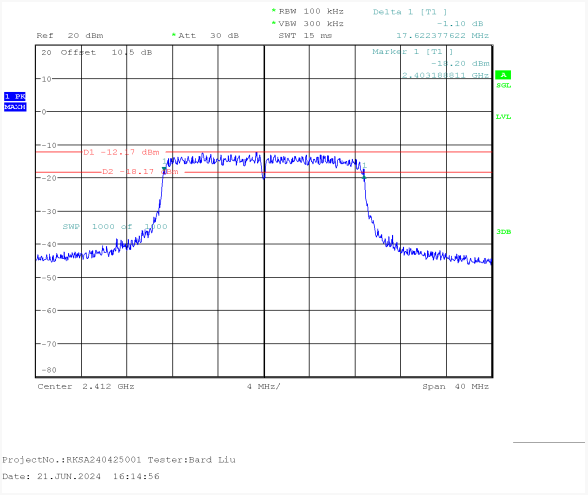
ProjectNo.:RKSA240425001 Tester:Bard Liu
Date: 21.JUN.2024 16:05:01

802.11g Mode High Channel



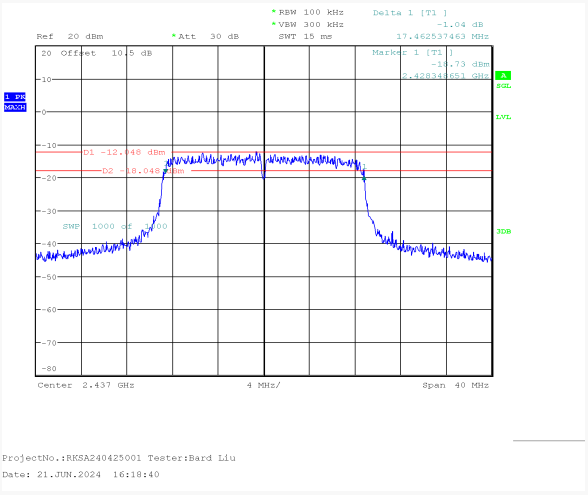
ProjectNo.:RKSA240425001 Tester:Bard Liu
Date: 21.JUN.2024 16:10:08

802.11n-HT20 Mode Low Channel



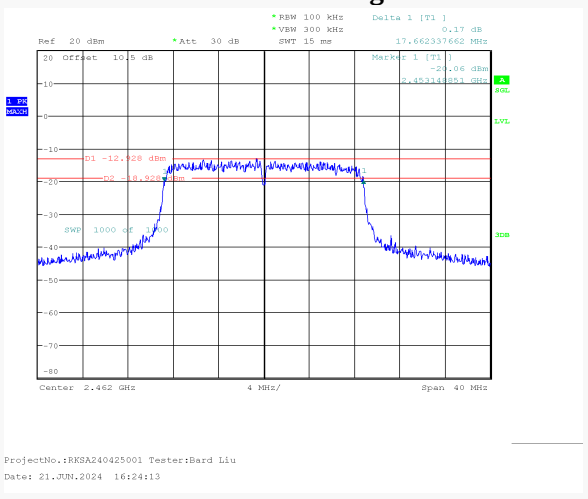
ProjectNo.:RKSA240425001 Tester:Bard Liu
Date: 21.JUN.2024 16:14:56

802.11n-HT20 Mode Middle Channel



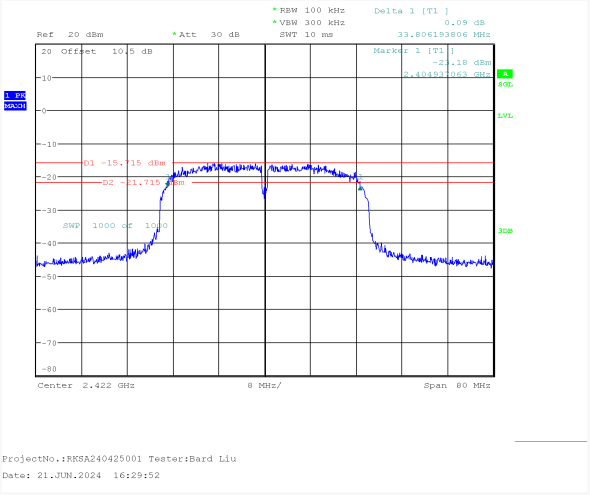
ProjectNo.:RKSA240425001 Tester:Bard Liu
Date: 21.JUN.2024 16:18:40

802.11n-HT20 Mode High Channel



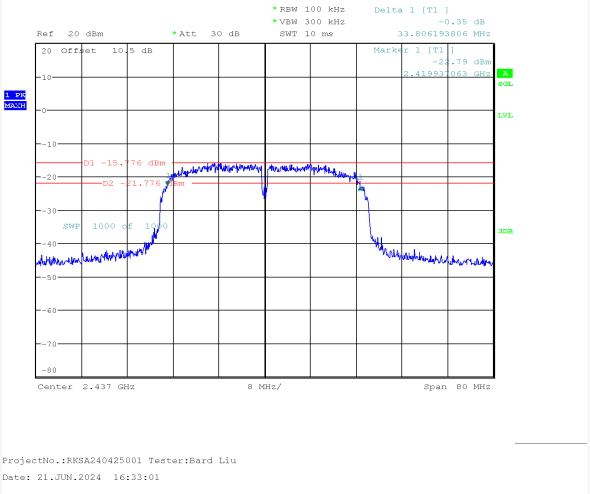
ProjectNo.:RKSA240425001 Tester:Bard Liu
Date: 21.JUN.2024 16:24:13

802.11n-HT40 Mode Low Channel



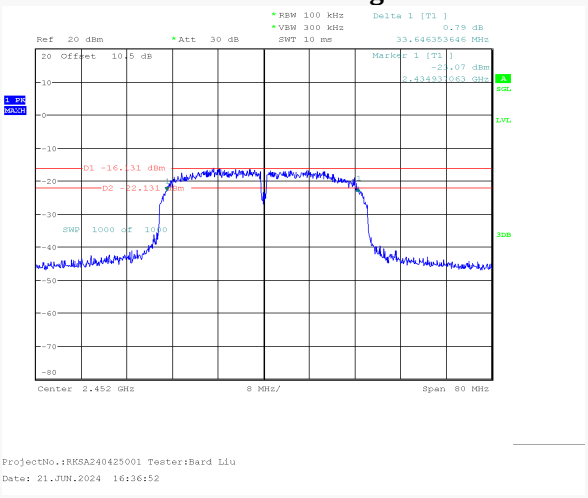
ProjectNo.:RKSA240425001 Tester:Bard Liu
Date: 21.JUN.2024 16:29:52

802.11n-HT40 Mode Middle Channel



ProjectNo.:RKSA240425001 Tester:Bard Liu
Date: 21.JUN.2024 16:33:01

802.11n-HT40 Mode High Channel



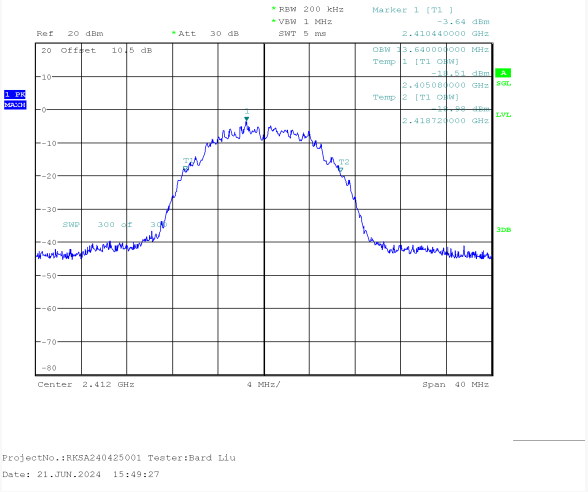
ProjectNo.:RKSA240425001 Tester:Bard Liu
Date: 21.JUN.2024 16:36:52

OCCUPIED BANDWIDTH

EUT operation mode: Transmitting

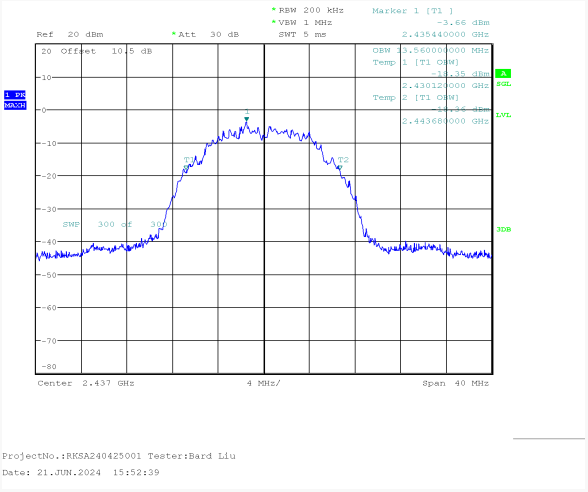
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)
802.11b Mode		
Low	2412	13.640
Middle	2437	13.560
High	2462	13.560
802.11g Mode		
Low	2412	16.760
Middle	2437	16.760
High	2462	16.760
802.11n-HT20 mode		
Low	2412	17.560
Middle	2437	17.560
High	2462	17.560
802.11n-HT40 mode		
Low	2422	35.120
Middle	2437	35.120
High	2452	35.120

802.11b Mode Low Channel



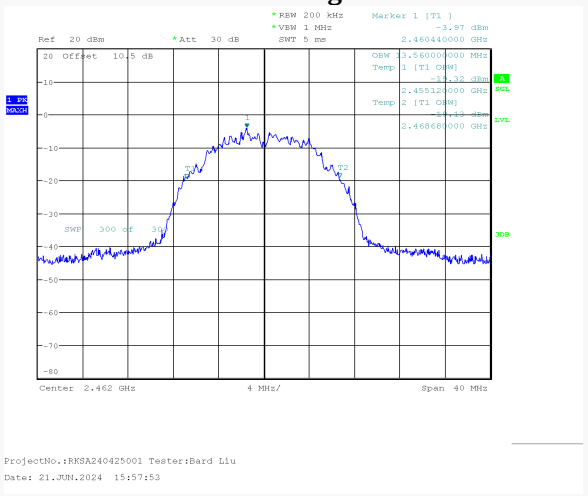
ProjectNo.:RKSA240425001 Tester:Bard Liu
Date: 21.JUN.2024 15:49:27

802.11b Mode Middle Channel



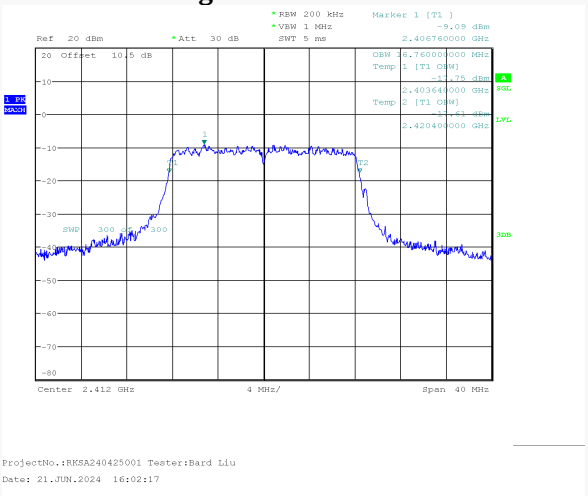
ProjectNo.:RKSA240425001 Tester:Bard Liu
Date: 21.JUN.2024 15:52:39

802.11b Mode High Channel



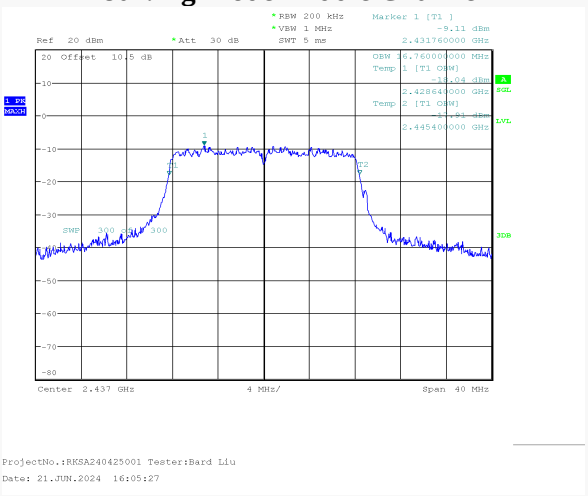
ProjectNo.:RKSA240425001 Tester:Bard Liu
Date: 21.JUN.2024 15:57:53

802.11g Mode Low Channel



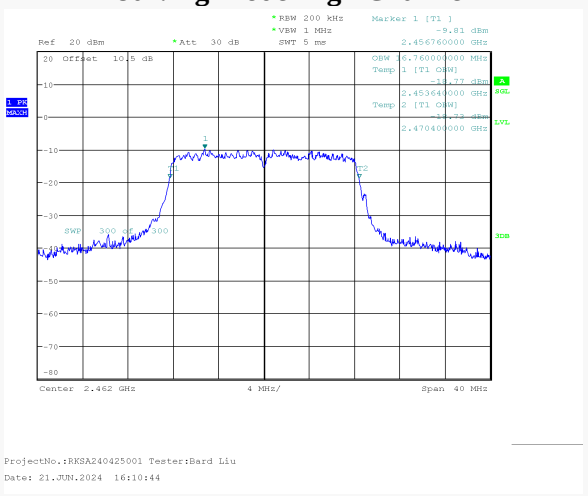
ProjectNo.:RKSA240425001 Tester:Bard Liu
Date: 21.JUN.2024 16:02:17

802.11g Mode Middle Channel



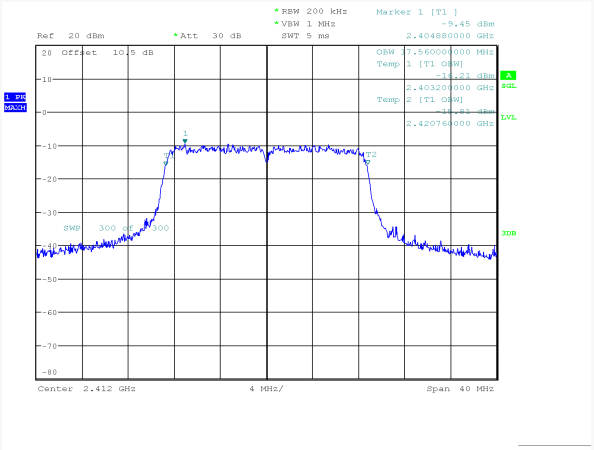
ProjectNo.:RKSA240425001 Tester:Bard Liu
Date: 21.JUN.2024 16:05:27

802.11g Mode High Channel



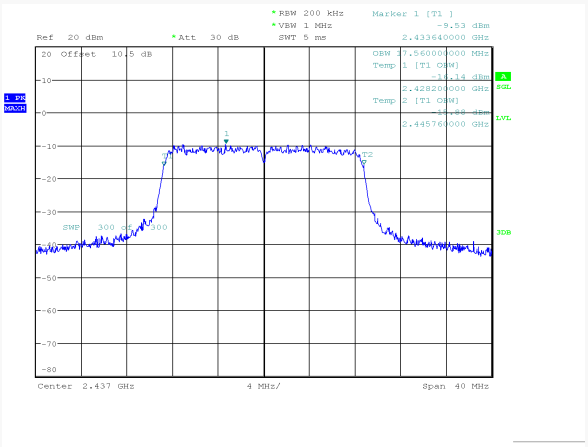
ProjectNo.:RKSA240425001 Tester:Bard Liu
Date: 21.JUN.2024 16:10:44

802.11n-HT20 Mode Low Channel



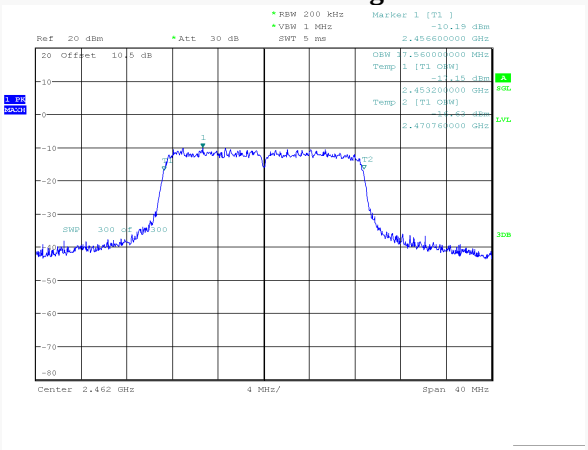
ProjectNo.:RKSA240425001 Tester:Bard Liu
Date: 21.JUN.2024 16:15:27

802.11n-HT20 Mode Middle Channel



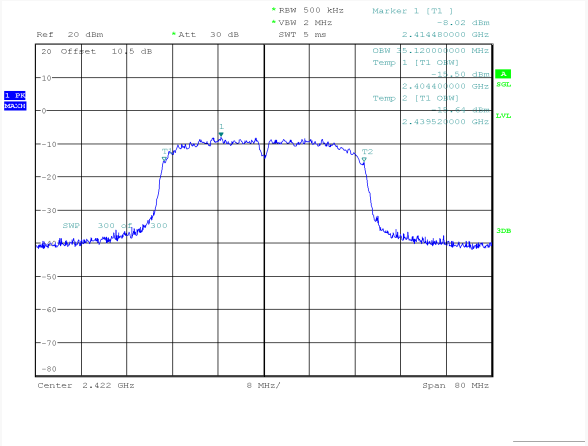
ProjectNo.:RKSA240425001 Tester:Bard Liu
Date: 21.JUN.2024 16:19:06

802.11n-HT20 Mode High Channel



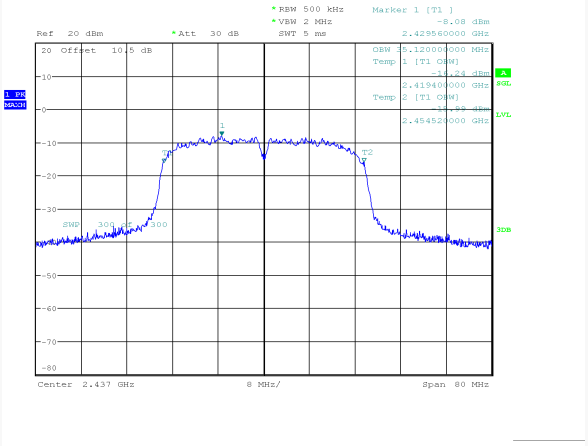
ProjectNo.:RKSA240425001 Tester:Bard Liu
Date: 21.JUN.2024 16:24:49

802.11n-HT40 Mode Low Channel



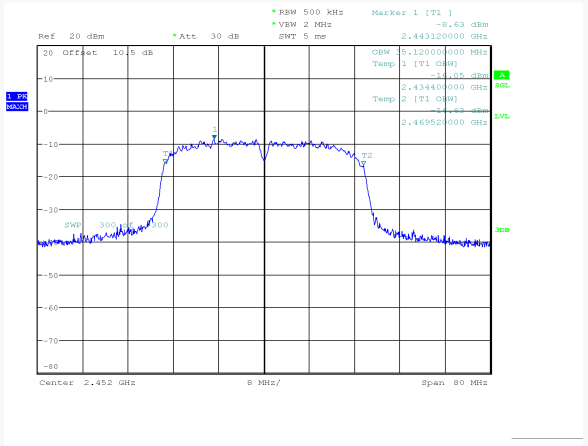
ProjectNo.:RKSA240425001 Tester:Bard Liu
Date: 21.JUN.2024 16:30:16

802.11n-HT40 Mode Middle Channel



ProjectNo.:RKSA240425001 Tester:Bard Liu
Date: 21.JUN.2024 16:33:26

802.11n-HT40 Mode High Channel



ProjectNo.:RKSA240425001 Tester:Bard Liu
Date: 21.JUN.2024 16:37:15

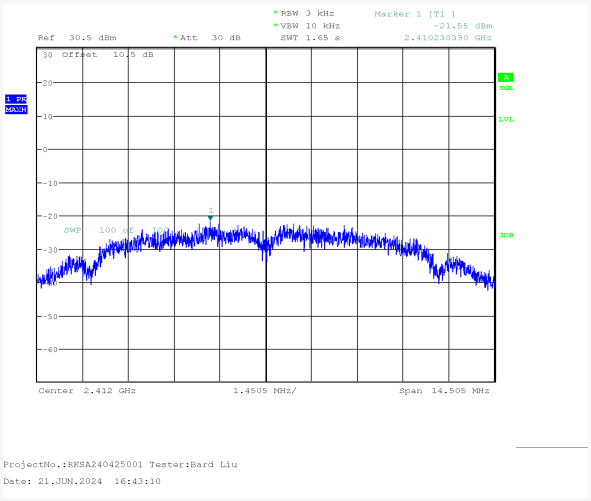
POWER SPECTRAL DENSITY

Test Result: Compliant.

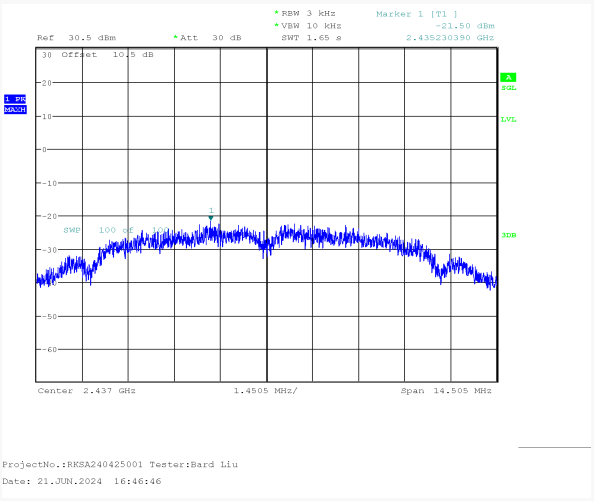
EUT operation mode: Transmitting

Channel	Frequency (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)
802.11b Mode			
Low	2412	-21.55	≤8
Middle	2437	-21.50	≤8
High	2462	-21.98	≤8
802.11g Mode			
Low	2412	-27.09	≤8
Middle	2437	-26.87	≤8
High	2462	-27.74	≤8
802.11n-HT20 mode			
Low	2412	-27.32	≤8
Middle	2437	-27.58	≤8
High	2462	-28.75	≤8
802.11n-HT40 mode			
Low	2422	-28.66	≤8
Middle	2437	-28.40	≤8
High	2452	-29.01	≤8

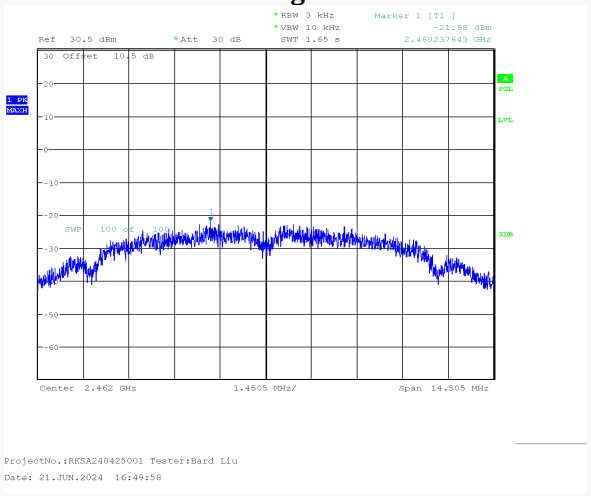
802.11b Low Channel



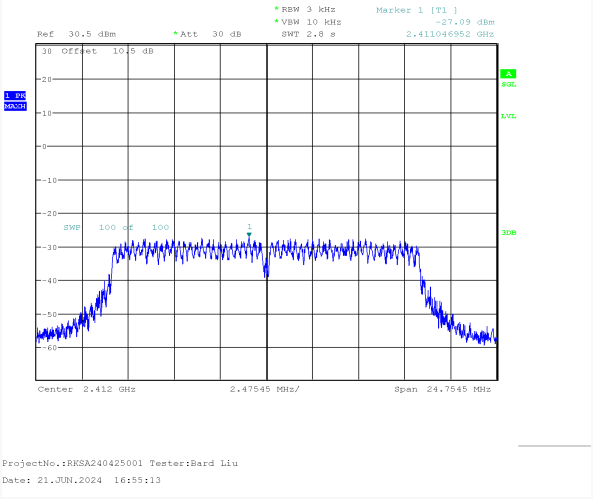
802.11b Middle Channel



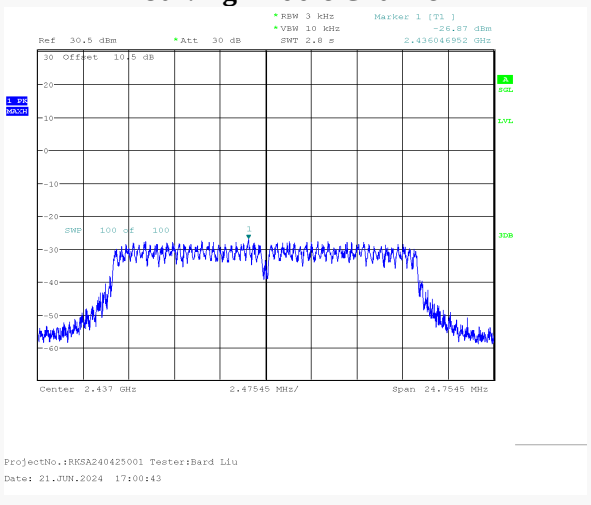
802.11b High Channel



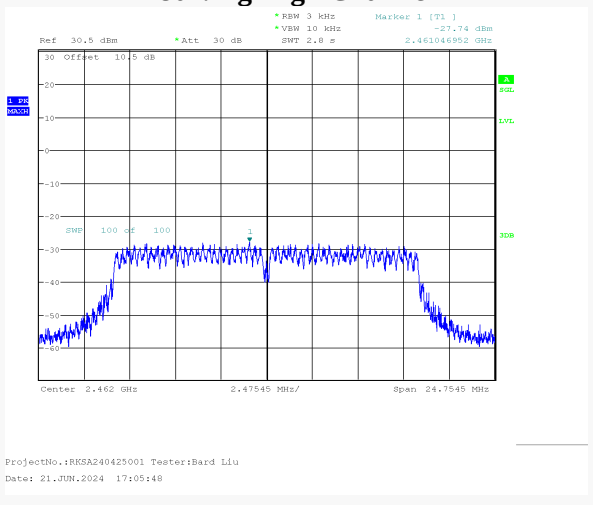
802.11g Low Channel



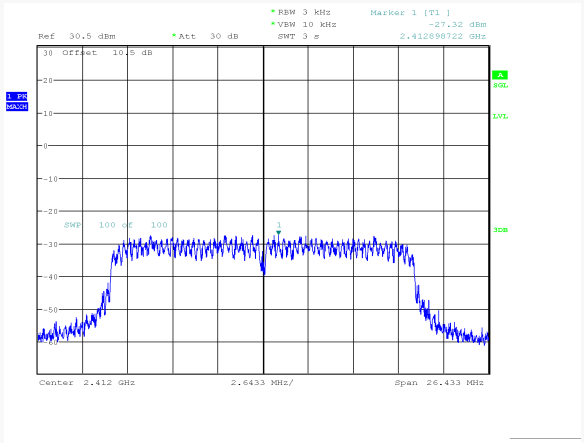
802.11g Middle Channel



802.11g High Channel

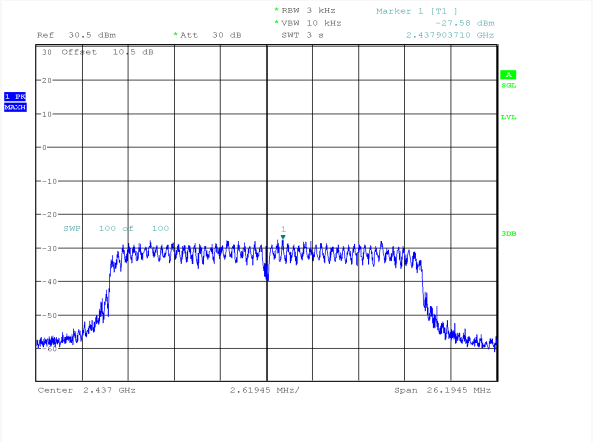


802.11n-HT20 Low Channel



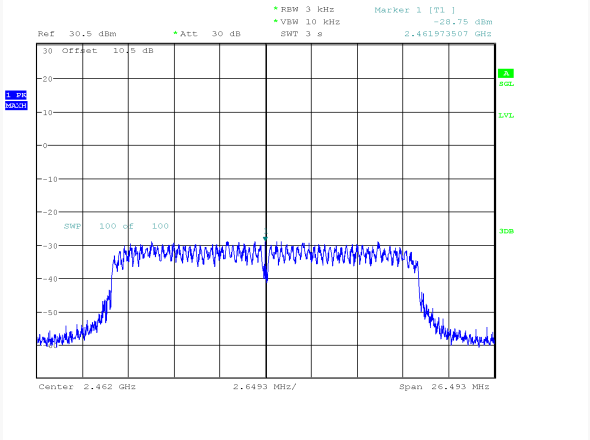
ProjectNo.:RKSA240425001 Tester:Bard Liu
Date: 21.JUN.2024 17:23:07

802.11n-HT20 Middle Channel



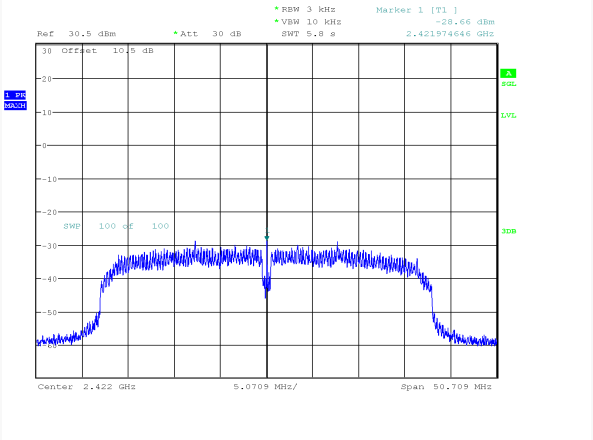
ProjectNo.:RKSA240425001 Tester:Bard Liu
Date: 21.JUN.2024 17:59:09

802.11n-HT20 High Channel



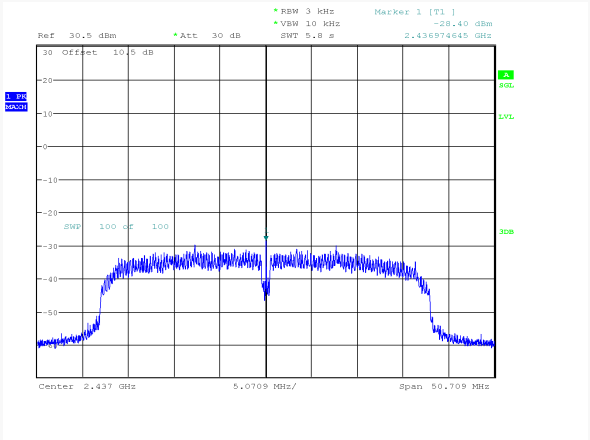
ProjectNo.:RKSA240425001 Tester:Bard Liu
Date: 22.JUN.2024 10:27:47

802.11n-HT40 Low Channel



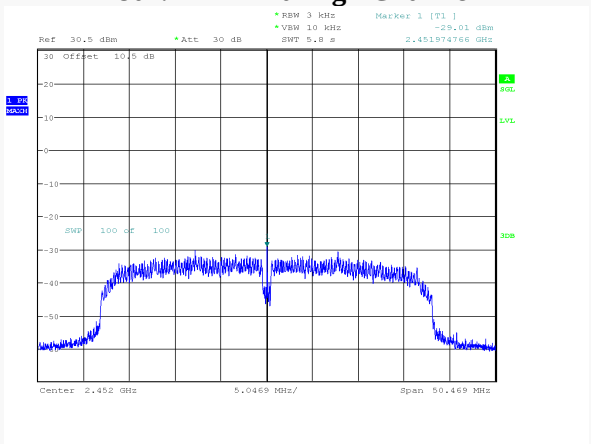
ProjectNo.:RKSA240425001 Tester:Bard Liu
Date: 22.JUN.2024 17:38:36

802.11n-HT40 Middle Channel



ProjectNo.:RKSA240425001 Tester:Bard Liu
Date: 22.JUN.2024 17:48:42

802.11n-HT40 High Channel



ProjectNo.:RKSA240425001 Tester:Bard Liu
Date: 22.JUN.2024 18:00:30

TRANSMITTER OUTPUT POWER MEASUREMENT

Model: X1

Channel	Frequency (MHz)	Max Conducted Peak Output Power (dBm)	Peak Output Power Limit (dBm)
802.11b Mode			
Low	2412	9.22	≤30
Middle	2437	8.91	≤30
High	2462	8.57	≤30
802.11g Mode			
Low	2412	9.72	≤30
Middle	2437	9.68	≤30
High	2462	9.09	≤30
802.11n-HT20 Mode			
Low	2412	10.06	≤30
Middle	2437	9.98	≤30
High	2462	9.38	≤30
802.11n-HT40 Mode			
Low	2422	9.75	≤30
Middle	2437	9.68	≤30
High	2452	9.22	≤30

Spot check with Model: X1 Lite

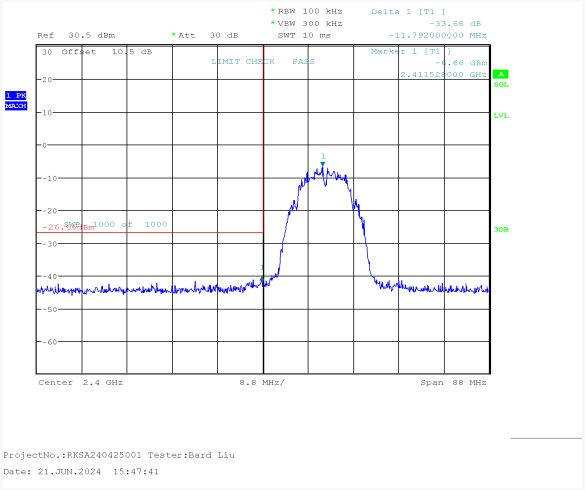
Channel	Frequency (MHz)	Max Conducted Peak Output Power (dBm)	Peak Output Power Limit (dBm)
802.11b Mode			
Low	2412	9.15	≤30
Middle	2437	8.84	≤30
High	2462	8.68	≤30
802.11g Mode			
Low	2412	9.57	≤30
Middle	2437	9.49	≤30
High	2462	9.34	≤30
802.11n-HT20 Mode			
Low	2412	9.94	≤30
Middle	2437	9.85	≤30
High	2462	9.46	≤30
802.11n-HT40 Mode			
Low	2422	9.58	≤30
Middle	2437	9.47	≤30
High	2452	9.33	≤30

Result：The test data results are close

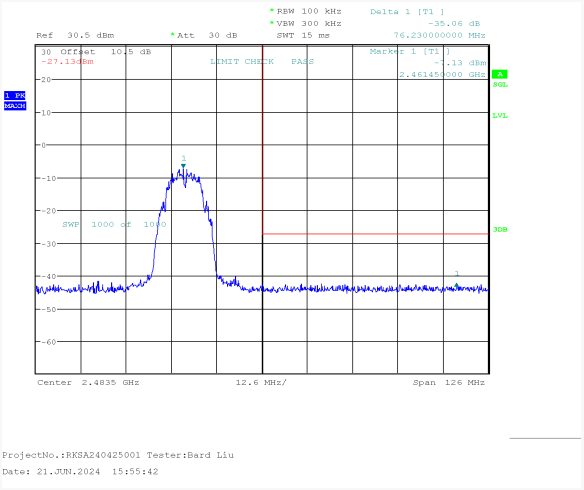
OUT OF BAND EMISSIONS

EUT operation mode: Transmitting

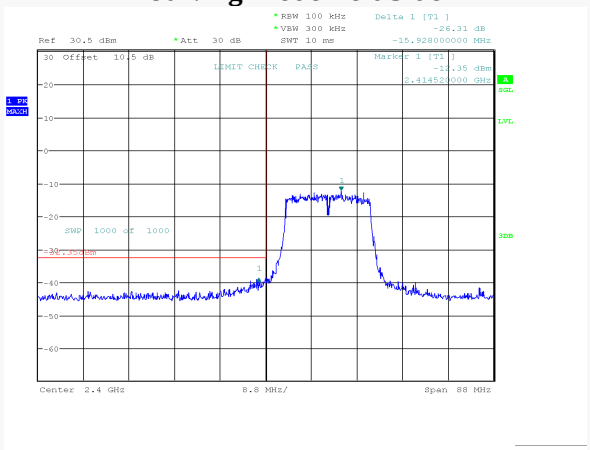
802.11b Mode Left Side



802.11b Mode Right Side

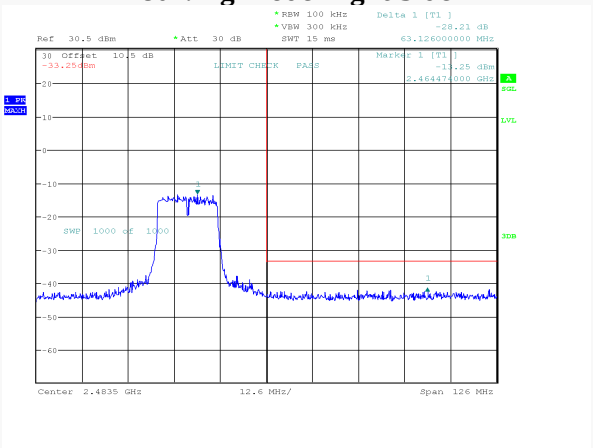


802.11g Mode Left Side



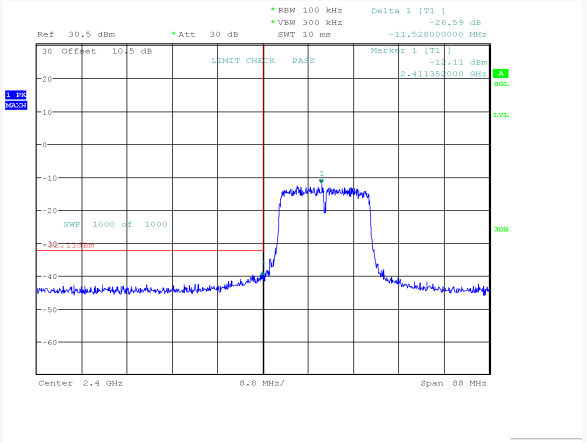
ProjectNo.:RKSA240425001 Tester:Bard Liu
Date: 21.JUN.2024 16:00:30

802.11g Mode Right Side



ProjectNo.:RKSA240425001 Tester:Bard Liu
Date: 21.JUN.2024 16:08:33

802.11n-HT20 Mode Left Side



ProjectNo.:RKSA240425001 Tester:Bard Liu
Date: 21.JUN.2024 16:13:40

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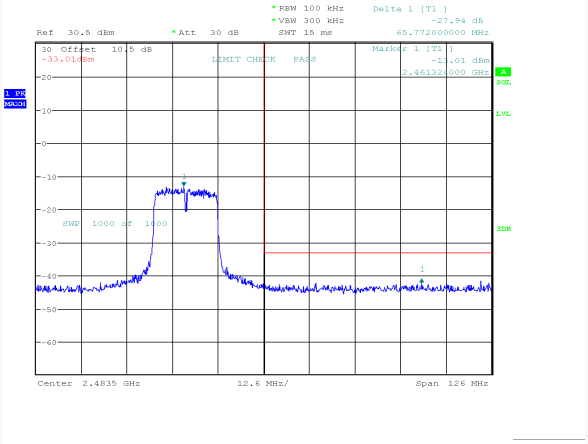
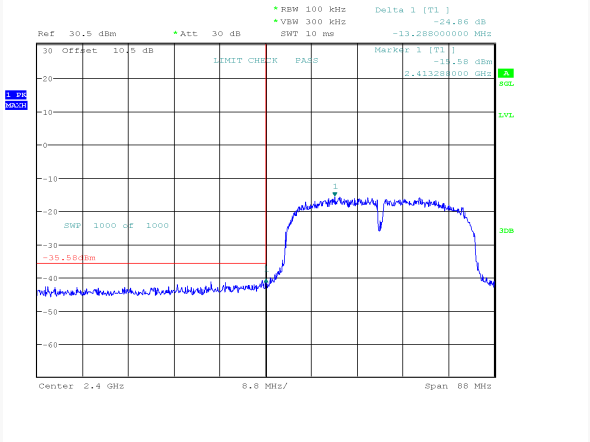


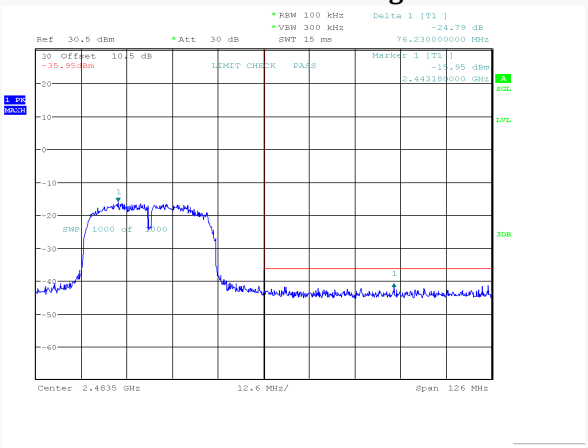
ProjectNo.:RKSA240425001 Tester:Bard Liu
Date: 21.JUN.2024 16:22:38

802.11n-HT40 Mode Right Side



ProjectNo.:RKSA240425001 Tester:Bard Liu
Date: 21.JUN.2024 16:29:03

802.11n-HT40 Mode Right Side



ProjectNo.:RKSA240425001 Tester:Bard Liu
Date: 21.JUN.2024 16:36:10

EUT PHOTOGRAPHS

Please refer to the attachment EXHIBIT A - EUT EXTERNAL PHOTOGRAPHS and EXHIBIT B - EUT INTERNAL PHOTOGRAPHS.

TEST SETUP PHOTOGRAPHS

Please refer to the attachment EXHIBIT C - TEST SETUP PHOTOGRAPHS.

Declarations

1. The laboratory is not responsible for the authenticity of any information provided by the applicant. Information from the applicant that may affect test results is marked with "★".

2. The test data was only valid for the test sample(s).

3. This report is valid only with a valid digital signature. The digital signature may be available only under the Adobe software above version 7.0.

4. Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.

5. The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor k=2 with the 95.45% confidence interval.

******* END OF REPORT *******